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June 1988
Vol. 8 No. 6 • ISSUE 101
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COMPUTER SHOPPER®

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Computer Shopper (ISSN 0886-0556) is published monthly for $21 per year by *Computer Shopper of Titusville, Inc.*, 5211 S. Washington Ave., Titusville, FL 32780. Second-class postage paid at Titusville, FL and additional mailing offices. POSTMASTER: Send address changes to *COMPUTER SHOPPER*, P.O. Box 1419, Titusville, FL 32781.

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Subscription $21 Per Year (USA Only)
COMPUTER SHOPPER, Inc.
5211 S. Washington Ave., P.O. Box F
Titusville, FL 32781
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Source ID No.: TCS575
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CONTRIBUTORS
Dr. Ron Albright, Lon Andrews
Jeff Brenner, Phillip Chien
Don Lancaster, Cheryl Peterson
Mark Fendrick, Ervin Bobo
Ronald Bobo, Andrew Fried
Johnathan Zittrain, Peter Ruber,
Barbara & John McMullen
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Charlotte Barbour, Tracy Kirkland,
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COMPOSITORS
Pamela Dowdy, Kandy Avery
Candace Cardonia, Susan Morris,
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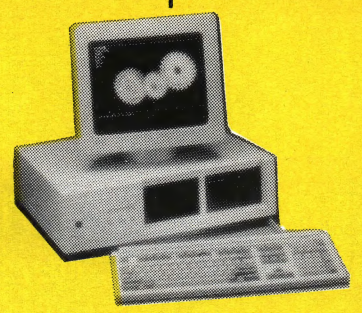

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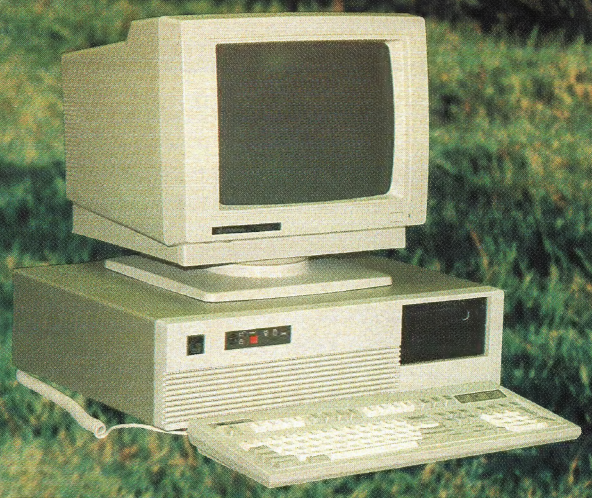

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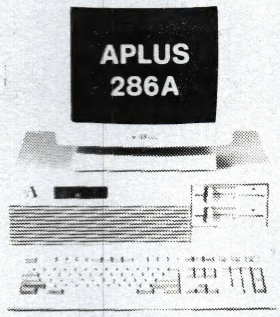

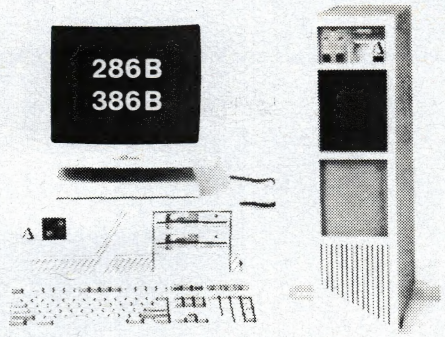

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- AT KEY BOARD (Mechanical Key Switch)
- FCC
- ONE YEAR WARRANTY

APLUS XT-10

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- 640K RAM ON BOARD (120NS)
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- CLOCK/CALLENDAR, BATTERY
- FDC (360KB/1.2MB, 5¼", 3½")
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- 150W POWER SUPPLY
- AT LOOK ALIKE CASE
- OPERATION MANUAL
- ONE YEAR WARRANTY

MONOCHROME SYSTEM	$680
RGB COLOR SYSTEM	$880
EGA COLOR SYSTEM	$1100

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- 80286 CPU, 512K RAM ON BAORD, UP TO 1MB
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- AT CASE
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- PARALLEL, SERIAL PORT
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0 WAIT
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0 WAIT

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- 1.2 MEG FLOPPY DRIVE
- DUAL FLOPPY AND HARD DISK CONTROLLER
- ENHANCED 101 KEY KEYBOARD
- 200 WATT POWER SUPPLY
- ONE PARALLEL PORT
- REAL TIME CLOCK AND CALENDAR
- 8 SLOTS, 80287 SOCKET
- AT STANDARD CHASSIS WITH RESET, TURBO SET, LED LIGHTS
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- TWO 360K FLOPPY DRIVES
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SUNNY 286-12 MHZ

0 WAIT LCD PORTABLE

- 80286 RUNNING 6 AND 12 MHZ
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- SOCKET FOR 80287, 5 SLOTS
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- TEAC 1.44M 145

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- Space Saving Case
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- 14" RGB Monitor

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- Dual HD/FD Controller
- 200W Power Supply
- Space Saving Case
- Clock/Calender with Battery Back up
- 101-Key Enhanced Keyboard (Keytronics)
- Color Graphic Card with Printer Port
- 14" RGB Monitor

☐ **COLOR II:**
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- 1.2MB TEAC Drive
- Dual HD/FD Controller
- 200W Power Supply
- Space Saving Case
- Clock/Calender with Battery Back up
- 101-Key Enhanced Keyboard (Keytronics)
- Enhanced Graphic Adaptor
- 14" EGA Monitor

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The True Challenge Of CD-ROM

Tooling Information Into Knowledge

by John J. Anderson

It takes time to learn how to use a powerful tool efficiently. You need to be familiar with the tool itself, and know how to use it. You also need to be familiar with the job you mean to do, and understand how that specific tool can help you to accomplish that job. For many, acquiring such mastery is an encompassing task.

There is a next step, however—a higher degree of mastery—and that grants to some of us the ability to *create* powerful tools.

Here is a short but accurate definition of a computer: a tool for making tools.

Therefore the computer is one of the most powerful tools we may imagine. Yes, a computer is a tool, but it is emphatically not a tool in the same way that, say, a monkey wrench is a tool.

It sometimes amazes me how many otherwise intelligent, computer-literate persons fail to recognize the importance of this distinction. They look at hardware and software as respectively equivalent to a Philips head and a sharp screw. Such a view is not incorrect; it is simply incomplete. It is ignorant of a basic truth concerning the nature of information technology: that while the computer represents a powerful tool for the accomplishment of tasks, it also represents the modern task of the accomplishment of tools. And toolmaking, after all, is what Homo sapiens are all about.

As your nearest anthropologist will tell you, a human culture is defined in terms of its tools. We are what we make, so to speak. And the beginnings of computer culture are upon us.

As computers continue to get cheaper, easier to use, and accessible to more people, they have an increasing effect on the fabric of our minds. Just as the evolution of the opposable thumb and the interlock of hand, eye, and brain have to this day shaped the development of our species, the computer has already begun shaping the development of our minds. Computers can make our work easier, but they must also make our minds stronger and smarter. It is not as specifically important that we use computers to process words, create a spreadsheet, or maintain a database, as that we use it as an external extension of the mind: strengthening the breadth, scope, and clarity of that mind. A Nautilus machine, if you will, for developing mind musculature.

We can abstract this introduction very simply, by looking at the yawning chasm that exists today between information and knowledge. Here's a 20th Century notion: computers can process information, but only humans can process knowledge. It sometimes amazes me how many otherwise intelligent, computer-literate persons seem to believe it shall always be thus. Personally, I see the flat, ugly bill of a platitude sticking out of that notion.

I could spend the rest of the magazine putting the case that in the 21st Century, such a notion will be viewed as quaint. But not to panic—our theme lies elsewhere.

The advent of CD-ROM throws the problem into sharp relief. Here we have a technology of immense power: the potential to put the Great Library of Alexandria onto a person's desktop. Yet ironically, we can see through the sheer power of CD-ROM how useless mere information is where there is no engine to transform that information into knowledge.

Strangers In Paradigm

The theme of Microsoft's Third International Conference on CD-ROM, held recently in Seattle, was "The Industry Emerges." Min Yee, Conference chairman, made an analogy in his opening remarks. He compared the emergent CD-ROM industry with the emergent movie industry at the beginning of this century. This is a comparison perhaps more apt than even Mr. Yee suspects.

At the advent of the motion picture, filmmakers were unable to conceive of the medium outside of the paradigms they already knew. As a result, they securely bolted the camera down in front of a stage play, and made a direct record of the proceedings from the point of view of a good seat in the audience. It took over 20 years and the vision of pioneers such as D. W. Griffith to realize the true power of the motion picture. Techniques we take for granted today: camera angles, dollies, pans, cuts, close-ups, parallel action, flashbacks, and so on—these were devised and mastered by people of extraordinary imagination. The people who accomplished these innovations were able to break through existing paradigms. They were able to maximize the potential of a new medium by creating new tools using that medium itself.

continued on page 11

Apple Introduces CD-ROM Drive

by John J. Anderson

Apple Computer has embraced optical storage technology by announcing the AppleCD SC, a compact disk read-only memory drive to be used with individual Macintosh and Apple II computers or shared by users connected to the AppleShare File Server.

In addition to being one of the first personal computer manufacturers to make a CD-ROM drive available through retail stores, Apple also is launching extensive efforts aimed at the third party development community to stimulate a wide array of CD-ROM disks.

CD-ROMs can store the resources of a small library—providing users access to vast quantities of pre-recorded information—including text, digitized images and sounds such as voice and music. A single 12-centimeter disk holds as much as 700 800K Macintosh floppy diskettes—well over 550 megabytes, or about 270,000 pages of typewritten text.

To date, publishers have used the extraordinary capacity of CD-ROMs primarily for text and number-oriented reference materials such as encyclopedias, catalogs and specialized databases of medical, legal, and financial information. These products have been available largely through value-added resellers that serve specific vertical markets. By making a CD-ROM drive readily available through retail and other sales channels, and by providing extensive support for developers, Apple expects to stimulate development of a much wider variety of CD-ROM products that take advantage of the graphics and sound capabilities of its Macintosh and Apple IIgs computers and can be used with the Apple II as well.

"CD-ROM is a logical extension of Apple's unique computing platform," said Jean-Louis Gassee, senior vice president of research and development. "One by one we have added capabilities that help people deal meaningfully with information: copy-and-paste simplicity, graphics, sound, processing power, systems integration and finally, in HyperCard, a radically different way of organizing and navigating through information. CD-ROM complements all of Apple's other strengths by providing a cost-effective and convenient delivery system for vast amounts and varieties of information. It's reasonable to expect that publishers will use the tools we've provided to build a completely new genre of information retrieval products."

"The arrival of an Apple CD-ROM drive is significant in other respects, too," Gassee continued. "An installed base the size of Apple's gives publishers the pool of potential customers they've been waiting for, while its retail, educa-

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About CD-ROM

CD-ROMs, compact disks with read-only memory, offer users unmatched convenience and security for bulk information handling. The manufacturing standard, developed and licensed by N.V. Philips, ensures that all CD disk drives will be compatible with all CD-ROM disks (machine-specific formats are exceptions to the rule).

CD-ROMs are about five inches in diameter. Yet a single disk can store up to 600 megabytes of permanent computer data—the equivalent of 1500 floppy disks or 250,000 pages of text.

Because of their design, CD-ROMs ensure against possible tampering with information or accidental erasure. Since CD-ROMs are read by a low-powered laser beam which optically scans the markings on the disk, they also do not wear out with repeated use.

CD-ROMs have numerous advantages over traditional methods of data storage:

- CD-ROMs are easy to store. Every telephone number in the U.S., for example, could be contained on five disks and kept in a desk drawer.
- Data is easily updated because only new data need be added at the premastering step; the updated disk would then replace the old disk.
- Despite the density of data, the error rate for a CD-ROM disk is lower than that of magnetic tape.
- CD-ROMs are capable of storing digitized data from many sources, including audio, images, text, and graphics.
- Duplicates can be stamped out mechanically at a much faster rate than magnetic tape can be reproduced.
- Random access makes CD-ROMs ideal as reference book replacements because they provide quick and easy access to specific information.
- A CD-ROM disk is lightweight and rugged. ●

CD-ROM continued from page 10

Missing Links

Now we stand at a threshhold conceivably more significant than that of the advent of the motion picture. CD-ROM gives us random access to immense amounts of pictures (both motion and still), sound, and data—in short, "interactive multimedia."

And yet, the early fruits of industry labors bear little more interest than Sarah Bernhardt's filmed portrayal of "Norma"(1906). There is what I term "incipient kitchen sinkism"evident in most CD-ROM titles today. That is a tendency to securely bolt a developer's system in front of a large database, and make a direct CD-ROM record of that database. Gee, that's great. The Encyclopedia Didactica on a single disk. But how do I transform that information into knowledge? Other than the fact that I no longer require two bookshelves to house the thing, what inherent advantage is there to containing the data in this new format?

The thing that we lack, the thing we shall spend the balance of this century and much of the next perfecting, are the dynamic links between bodies of linear information. In so doing, we shall embark on the first steps toward the creation of a "knowledge engine," capable of providing users not only with volumes of information, but with a means of transforming that information into knowledge.

That the creation of such a tool is the real challenge of CD-ROM is known to John Sculley of Apple Computer, who was in Seattle to announce Apple's new CD-ROM drive. His closing address to attendees was the dramatic high point of the conference. An abridged version of his comments follows.

Sculley's Vision Of CD-ROM

"Thank you very much. I'm very happy to be in the state of Washington—the Apple Capitol of the world. I'm afraid we can't quite compete with the number of apples that are shipped up here each year, but we're working on it.

Two years ago when this conference was first inaugurated, Bill Gates compared the development of CD-ROM with the discovery of papyrus as a medium for recording events. And as you know, paper has been a modest success. Despite the warnings of some, books and paper won't ever be completely replaced by technology. In fact, through desktop publishing, technology has raised the standard of printed documents to new levels of elegance and style—by making them look more like books and less like computer printouts. The printed page is an enduring, universal medium.

CD-ROM disks are lightweight, durable, and rugged.

What CD-ROM promises is another universal medium for delivering information, that brings together forces from three industries—computing, publishing, and entertainment. It has redefined existing categories, and is creating brand new ones. It provides a medium for many data types—graphics, sound, text and images—and is multiplying the potential of each of these types by providing a gateway to multimedia experiences.

So it's a truly revolutionary concept. If you can express it electronically, you can store it on CD-ROM.Yet some seem impatient for mass acceptance of CD-ROM. But if you consider how long it took for paper to become popularized, we're not really doing too badly.

The Chinese developed methods for manufacturing paper in the First Century AD. And the Egyptians had been writing on papyrus stalks for centuries. But paper didn't find its way to the West until hundreds of years later, when jailers in an Eighth Century Turkish prison learned the art of papermaking from their Chinese prisoners. And from there paper-making spread to Europe. But for another 500 years parchment remained the dominant medium. It took over 1000 years from its first development in China for paper to be recognized as a revolutionary tool by Western Civilization.

And we're just beginning year three of CD-ROM.

The exhibits and the new products we've seen in the past few days confirm the predictions that CD-ROM will be a significant and enduring medium for storing information. But what will guarantee that CD-ROM will live up to its potential as a revolutionary medium? Let's look at the phrase "storage medium."

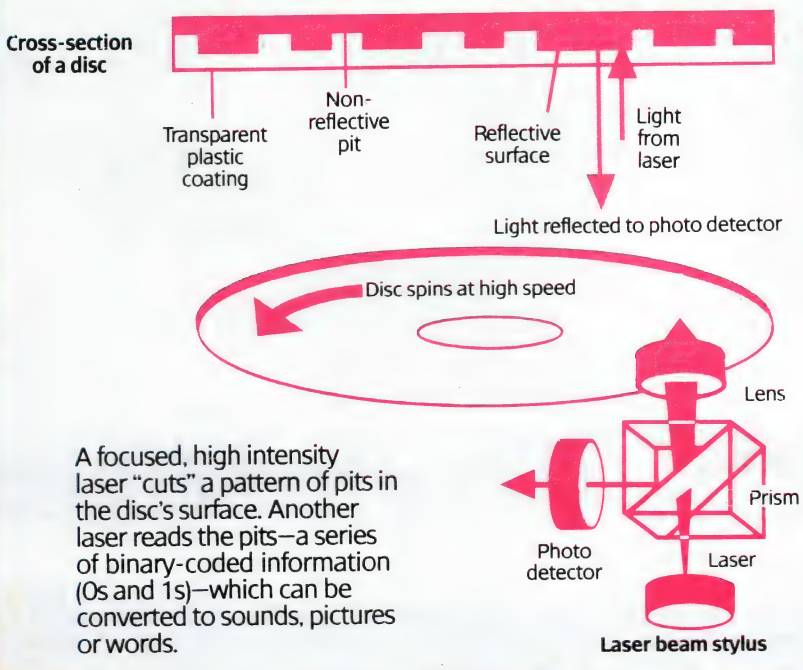
The word "storage" can conjure up different images for us. It might remind us of those boxes of books and papers from college that we never threw out and were left to gather dust in a storage locker somewhere. Some common terms used to define storage are: to abandon, to put into mothballs, to put on the back burner, to pickle, to preserve, to salt, to leave to rot. Now that pretty well describes my college papers.

But storage is also described as a source, supply, a nest egg, a collection, and a treasure. And I think this last definition, treasure, especially applies to CD-ROM storage capabilities.

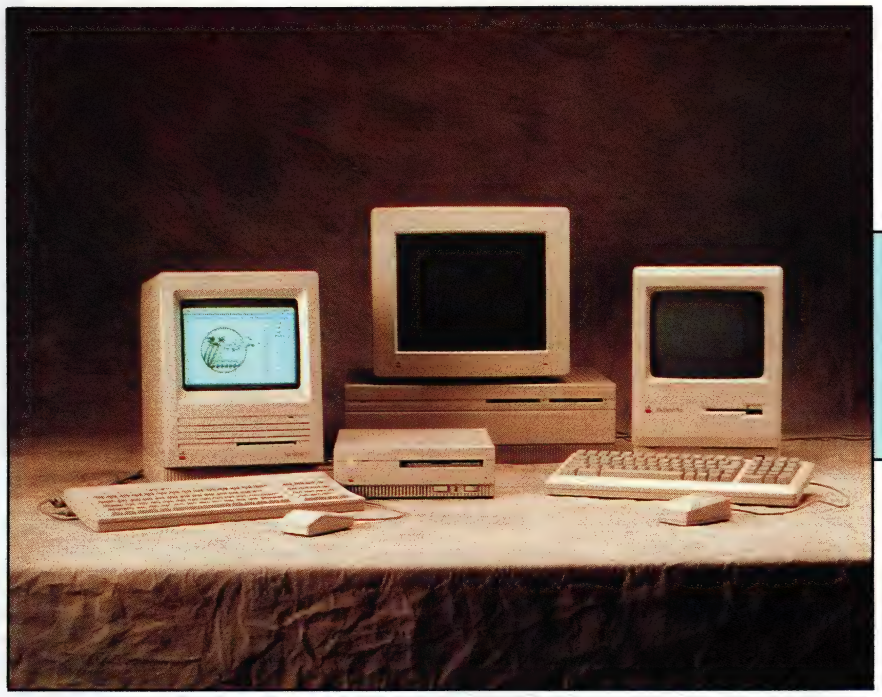
But not buried treasure. Unlike the contents of a padlocked storage room next to a freeway, the data on a CD-ROM is more accessible. The problem is there's a lot more of it. If you filled one CD-ROM with a detailed list of furniture, rugs, trunks, and old college term papers, it could hold the contents of every basement and attic in Redmond, Washington. Now what that means is that while the CD-ROM is a high density, very cost-effective medium, there's a greater risk that its messages might get lost in a sea of data.

continued on page 45

How an optical disc works



A focused, high intensity laser "cuts" a pattern of pits in the disc's surface. Another laser reads the pits—a series of binary-coded information (0s and 1s)—which can be converted to sounds, pictures or words.



AppleTalk forges a link between CD-ROM drive and multiuser access.

Apple Drive continued from page 10

tion and corporate sales channels provide an efficient way to get products to those customers."

"We're already seeing exciting examples of the rich learning environments that can be created with CD-ROM databases that incorporate text, images and sound," Gassee said, referring to several projects underway at major U.S. universities that bring together instructional curricula with research materials. For example, Boston University and Harvard University are collaborating on the "Perseus Project," which is integrating more than 100 megabytes of text with 10,000 images that pertain to the history, political science, languages, art and philosophy of ancient and classical Greece. University of Southern California's "Project Jefferson," which combines online retrieval, hypermedia and curriculum development with an integrated software package based on the U.S. Constitution, and Brown University's "Intermedia" project, a multi-user workstation environment for scholars and researchers, are two other examples of sophisticated information retrieval systems that utilize CD-ROMs. Educators of younger students also are using encyclopedia and other reference works on CD-ROM as well as developing multimedia databases.

Currently available disks for the AppleCD SC, outside the realm of education, are designed for specific professions. These include "Kwikee Inhouse," a graphics service for advertising layouts (Multi-Ad Services, Peoria, IL); a medical database, "Medline Knowledge Finder," (Aries Systems Corporation, North Andover, MA); "Real-Scan" real estate management system (LaserScan Systems, Miami, FL); and "Books in Print Plus" (Bowker Electronic Publishing, New York), which is used in libraries as well as bookstores.

The legal and healthcare markets are especially well-suited for CD-ROMs. Their reference materials are often published without cumulative indices, which makes manual data searches very cumbersome. Relational databases published on CD-ROM disks would provide many of the benefits of online information services, such as enabling users to search by key words, without costly communications charges.

Apple also expects corporations to become significant users of CD-ROMs for inhouse publishing of manuals, catalogs and corporate databases; to distribute reference materials (such as parts lists in the automotive industry) and "boilerplate" documents (in insurance, for example); and courseware and tutorials in industrial training applications. Federal, state and local governments also could use CD-ROMs for storing and copying forms on demand, for easy access to government policies and regulations, to store training manuals and to distribute materials that are frequently quoted or incorporated into documents, such as military parts specifications, building codes, health and safety ordinances and the like.

CD-ROM titles for consumers are likely to serve home educational needs (encyclopedias, atlases and other reference books), sound studios and musicians (sound and special effects libraries for creating synthesized music, for example) or work at home (word processing software and writers reference tools, for example).

To expedite development of CD-ROM titles in all of these markets, Apple has designed its drive to be compatible with the International Standards Organization's standard file format, commonly known as "High Sierra." While Macintosh and Apple II file support will be available when drives are first shipped to customers, ISO/High Sierra support will come a little bit later. Customers who purchase drives before that time will receive a software upgrade free of charge.

In addition, Apple is providing extensive support to potential publishers. Some 500 developers attended an Apple CD-ROM Development Conference held at the tail end of the Microsoft Conference in Seattle. Speakers representing Apple and current CD-ROM publishers discussed topics such as hardware and software tools, data preparation and designing the human interface.

Apple also plans to support developers by offering a starter kit that will give them a cost-effective way of quickly developing prototype CD-ROM disks. Specific elements of the starter kit—hardware, software, and coupons for converting hard disk data to a CD-ROM disk—will be announced to developers at the time the Apple CD SC begins shipping in quantity.

At the conference and as an ongoing service to interested developers, Apple has demonstrated how its HyperCard software can be used as part of Macintosh CD-ROM disks. HyperCard lets users easily navigate through large quantities of data by association and context, rather than merely by hierarchical indexes. HyperCard provides developers with an alternative to programming the Macintosh interface. And just as the Macintosh development environment provides a consistent graphic interface with icons and windows, HyperCard provides consistent elements such as cards, buttons and stacks that can be used across applications. Users do not have to learn new command schemes with each new disk they acquire.

HyperCard also is an open-ended development environment that can be customized for particular projects. For example, teams on both the Perseus and Jefferson projects have used the extension capabilities of HyperCard, adding functions which are important for searching very large relational databases. Apple's technical staff will work closely with publishers in augmenting HyperCard functions.

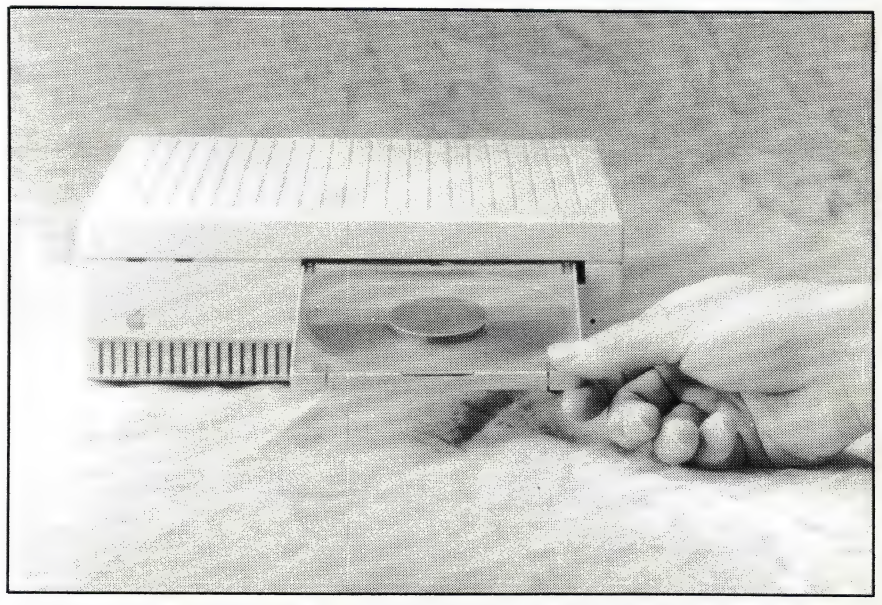
The AppleCD SC drive, which will be available in the U.S. very soon at a suggested retail price of $1199, features a 64K memory buffer and SCSI interface that enables it to transfer data more quickly, and an audio chip set and "desk accessory" software that let it play audio CD tracks on CD-ROM as well as commercial audio compact disks. The drive includes a headphone jack, two RCA audio jacks for external amplifiers and a universal power supply that makes it compatible with electrical standards around the world. By early fall, Apple will ship the unit in six language versions—Kanji (Japan), British, French Canadian, German, French, Dutch, Swedish, and Italian.

Disks are loaded in the AppleCD SC drive through a slot in the front of the drive. Prior to loading, disks are placed in an Apple CD Caddy—a sturdy plastic case that protects the disk and offers convenient storage for the user. The CD caddy will be available in five-pack bundles. Front access allows the drive to be stored above or below the computer without taking up additional desk space. The AppleCD SC has the same footprint as Apple's other SCSI storage products, which lets it easily be stacked with those devices.

The unit plugs directly into the SCSI port of Macintosh Plus, SE and II computers. The Apple IIe and GS require an upgraded version of the Apple SCSI card, available for $299. The drive can be daisy-chained to as many as six other SCSI peripherals.

In addition, both Macintosh and Apple II users can share information and lower the cost of the AppleCD SC per user by connecting to an AppleShare File Server (version 2.0). Plans for A/UX, Apple's implementation of the UNIX operating system for the Macintosh II, to support the Apple CD-ROM drive also are underway.

The drive comes with an accessory kit that contains an Apple CD Caddy, software drivers, Apple CD Remote Desk Accessory software (which controls functions needed to play audio CDs), and an owners manual. ●



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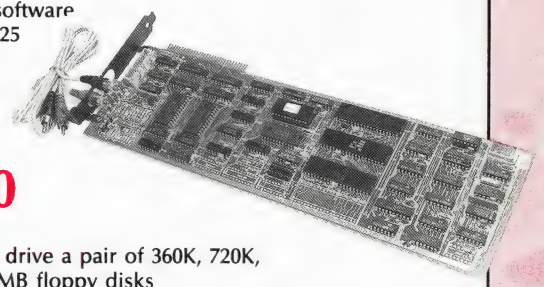

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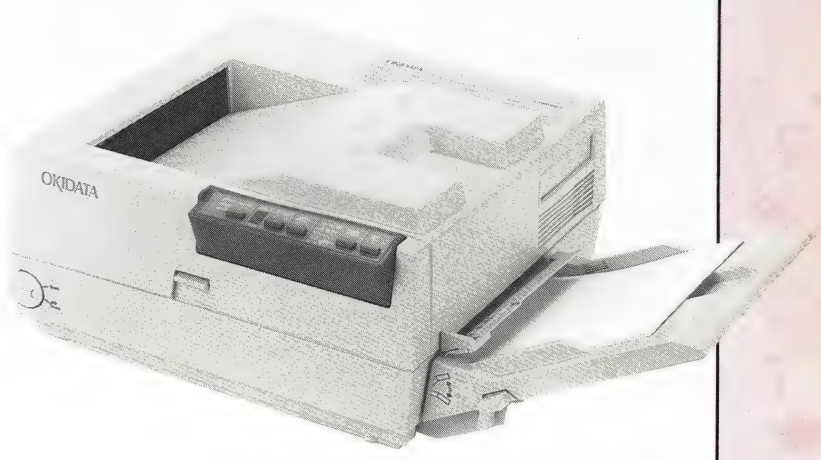

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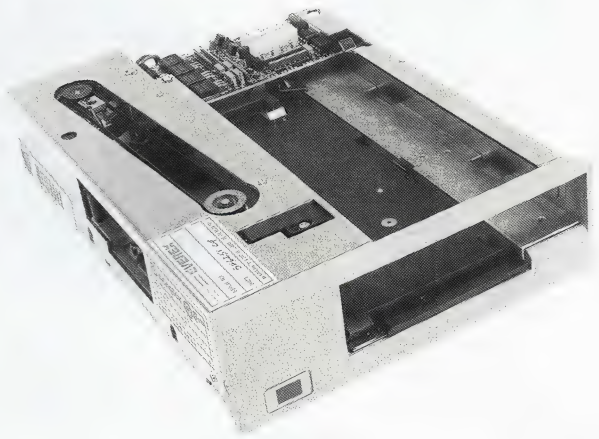

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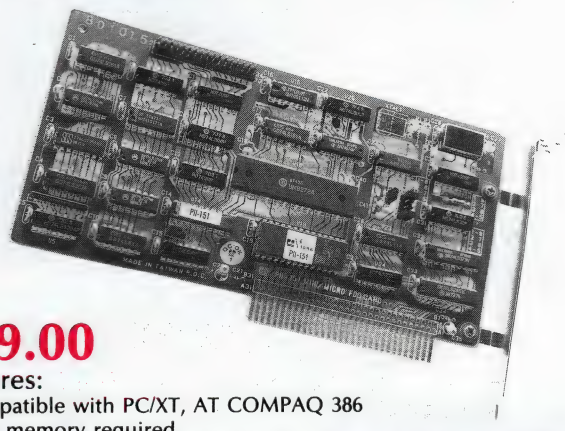

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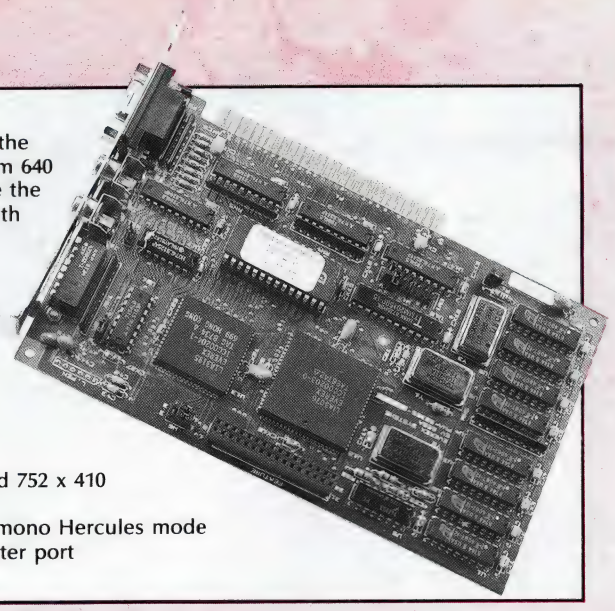

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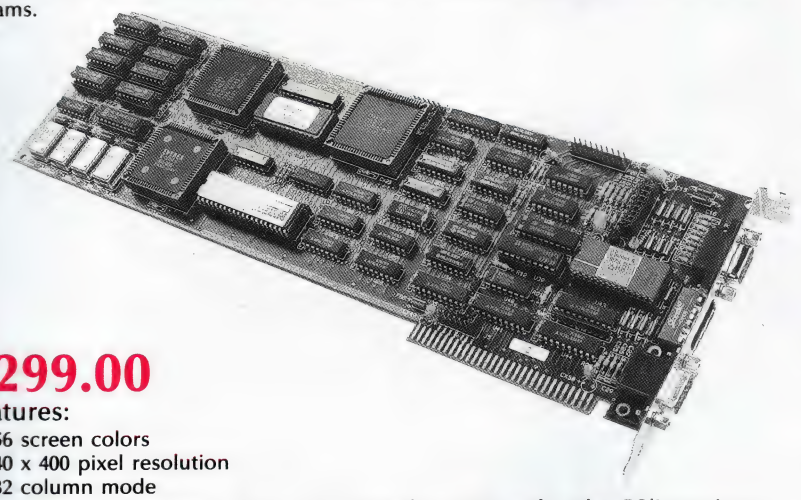

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- 300/1200/2400 Baud Modems
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- Panasonic Printers
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Hard Disk and Floppy Controller Cards

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Adaptek or OMTI RLL Hard Disk Controller for XT	$ 93
Stanford Hard Disk Controller for XT	$ 70
Stanford Hard and Floppy Controller for XT	$ 95
Western Digital Hard and Floppy Controller for AT	$170
DTC RLL Hard and Floppy Controller for AT	$210
NCL Hard and Floppy Controller for AT	$160
Stanford Hard Disk Drive Controller for AT	$118
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Main Boards

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4.77/10 MHz XT Turbo with Phoenix BIOS	$ 112
Baby AT Main Board 6/10 0 wait state Phoenix BIOS	$ 398
STD AT Main Board 6/10 1 wait state Phoenix BIOS	$ 375
Baby AT Main Board 6/8/10/12 1 wait state Award BIOS	$ 368
Baby AT Main Board 6/12 1 wait state Award BIOS	$ 368
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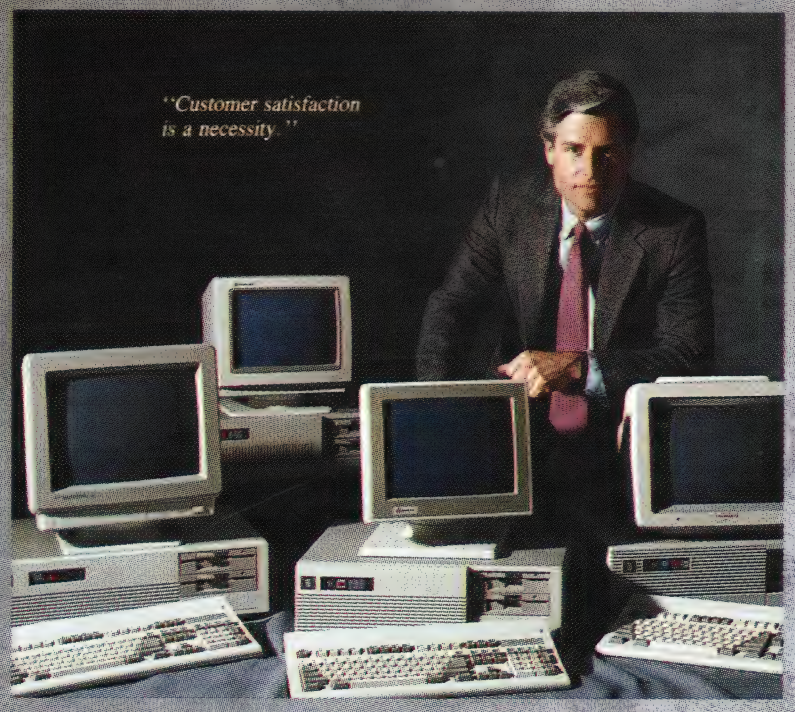

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SYSTEMS

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Intel true 32 Bit 80386-20 CPU (20 MHz) 9/20 MHz software (keyboard) switchable clock • CMOS memory, 16 channel Interrupt, 7 DMA channels • RAM can be expanded to 16.5 MB of 32 bit high speed interleaved memory • 2–32 bit, 4–16 bit and 2–8 bit expansion slots • Supports 80387-20 and/or 80387-16 Math co-processors • Award BIOS ver. 3.03, all set up utilities are programmed in ROM • (Phoenix BIOS optional) • Plus basic system features.

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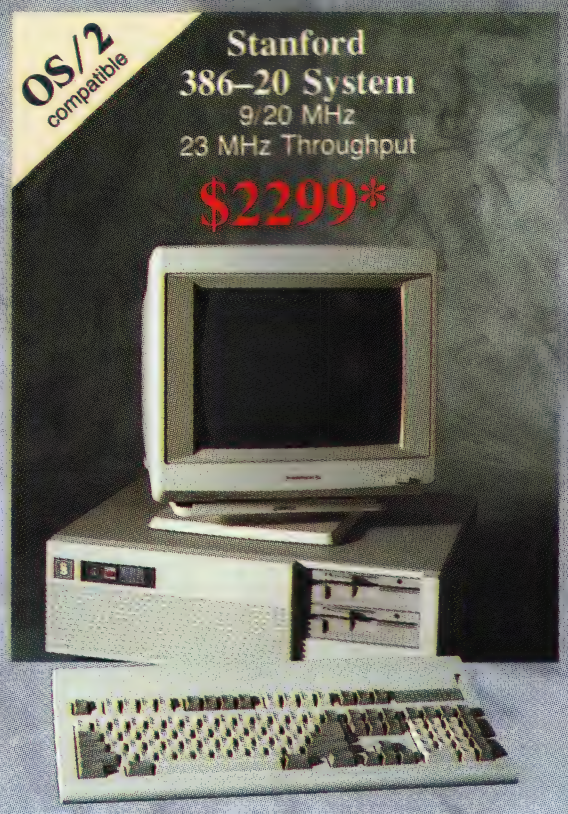

SYSTEMS

Stanford 4.77/10

4.77/10 Mhz, software switchable M/B • Phoenix BIOS, Norton SI: 3.3 • Socket for 8087 Math co-processor • Multi I/O card controls 2 floppies – serial port (Com 1) parallel port, clock/ calendar, 2nd serial port (Com 2) and game port optional • 360K floppy drive • AT/XT style keyboard • AT Jr. case, XT size with AT features • Hardware reset switch and Turbo L.E.D. • Keyboard lock, power L.E.D. • 150 watt power supply • 8 expansion slots • High quality, heavy duty packaging

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Model 316 16MHz '0' Wait State 80386 Mono System.**$1995**
For an EGA System..... **$2315**

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130MB 18ms..... **$1895**

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Star Micronics NX1000 9 Pin.....**$199**
Okidata 192+9 Pin.....**$350**
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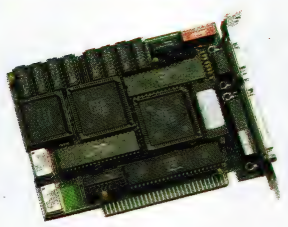

Mono.....**$75**
Mono (Fonts).....**$128**
EGA Deluxe / Printer Port.....**$149**
EGA Deluxe.....**$139**
CLUB Ultimate EGA.....**$130**
CLUB VGA Card..... .....**$295**

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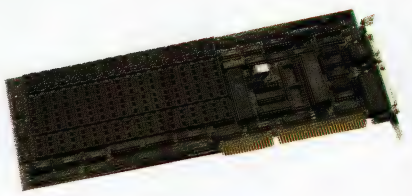

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576K Memory Card for XT.....**$53**
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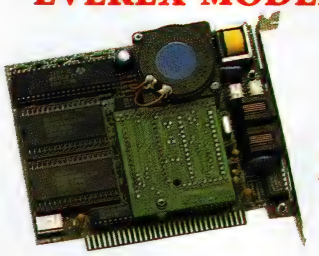

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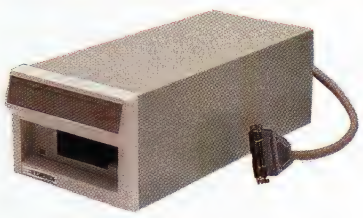

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40 MB (Cassette)	**$580**	**$620**
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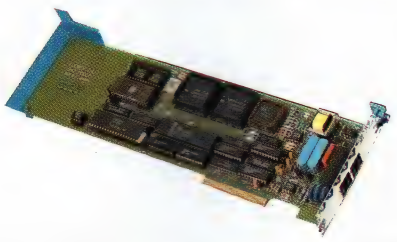
60MB (Cartridge)	**$757**	**$827**
125MB (Cartridge)	**$995**	**N/A**

PRODUCTS for PS/2



RAM 4000 EMS Board.....(0K) **$399**
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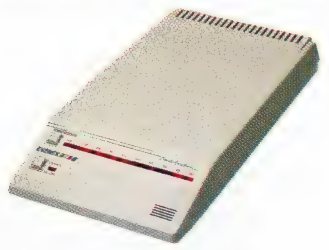
125MB Tape Backup Ext.....**$1595**
PS/2 Modem 2400 Baud Int.....**$299**

PRODUCTS for MAC



	INT	EXT
20MB HD	**$445**	**$645**
40MB HD	**$899**	**$949**
60MB Tape Backup	**N/A**	**$950**
2400 Baud Modem	**N/A**	**$320**

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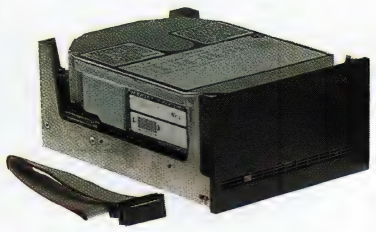

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(with Controller and Software)

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30MB ST238 65ms.....**$310**
40MB ST251 39ms.....**$485**

For AT

20MB ST225 65ms.....**$279**
40MB ST251.....**$425**
44MB Micropolis 28ms.....**$560**
71MB Micropolis 28ms.....**$710**
130MB Priam 18ms.....**$1895**

OTHERS

80287-6.....**$169**
80287-8.....**$230**
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80387.....**Call**
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101 Keytronic Keyboard..**$55**
DOS 3.3.....**$95**
Mechanical Mouse.....**$55**
Optical Mouse.....**$75**
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720K 3½" Floppy.....**$105**
1.2MB 5¼ Floppy.....**$95**
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195 Watt Power Supply for AT.....**$135**
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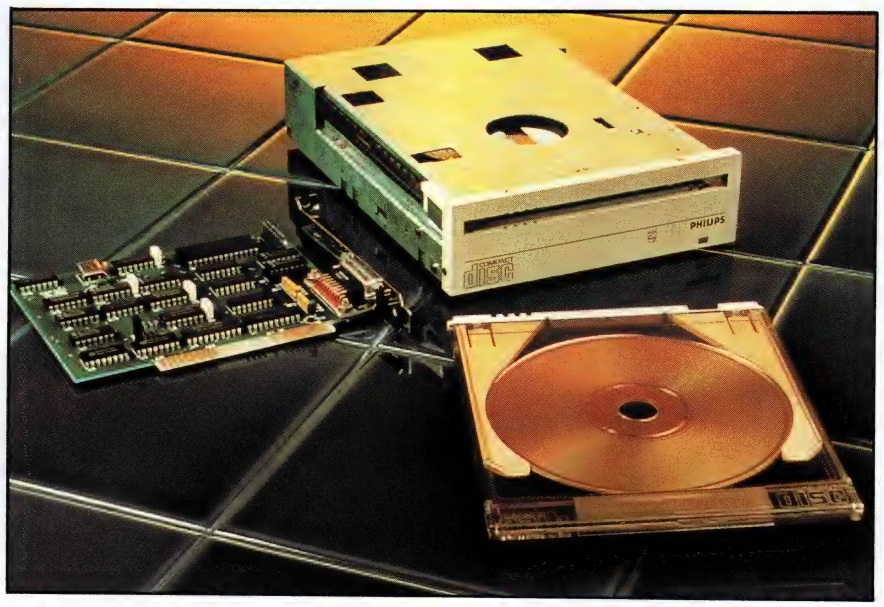
Third International Conference On CD-ROM

Heralding An Emergent Industry

by John J. Anderson

A year ago, CD-ROM was a promising technology; a year from now, CD-ROM will be a self-sustaining industry. Today, we stand on the threshhold that separates past promise from future performance. Reflecting this status, the theme for the Third International Conference on CD-ROM was "The Industry Emerges."



By all reports, this emergence is proceeding rapidly: drive sales, product releases, and in-house development activity are increasing at a gratifying pace. An indicator of particular interest is the number of exhibitors at this year's Conference—more than twice last year's total. Clearly, the industry is emerging. But where is it heading?

Several speakers at the Conference had ideas to offer on that subject, including Joe Dionne (McGraw-Hill), Bill Gates (Microsoft), Jim Manzi (Lotus), and John Sculley (an abridged transcript of Sculley's comments appears in an accompanying article).

As opposed to last year, many more of this year's attendees have projects either under way, or under close consideration. Breakout sessions at the conference were organized into four tracks: one for managers, one for marketers, one for producers, and one for authors and designers. Presenters in nearly all cases drew directly from their own recent CD-ROM experiences.

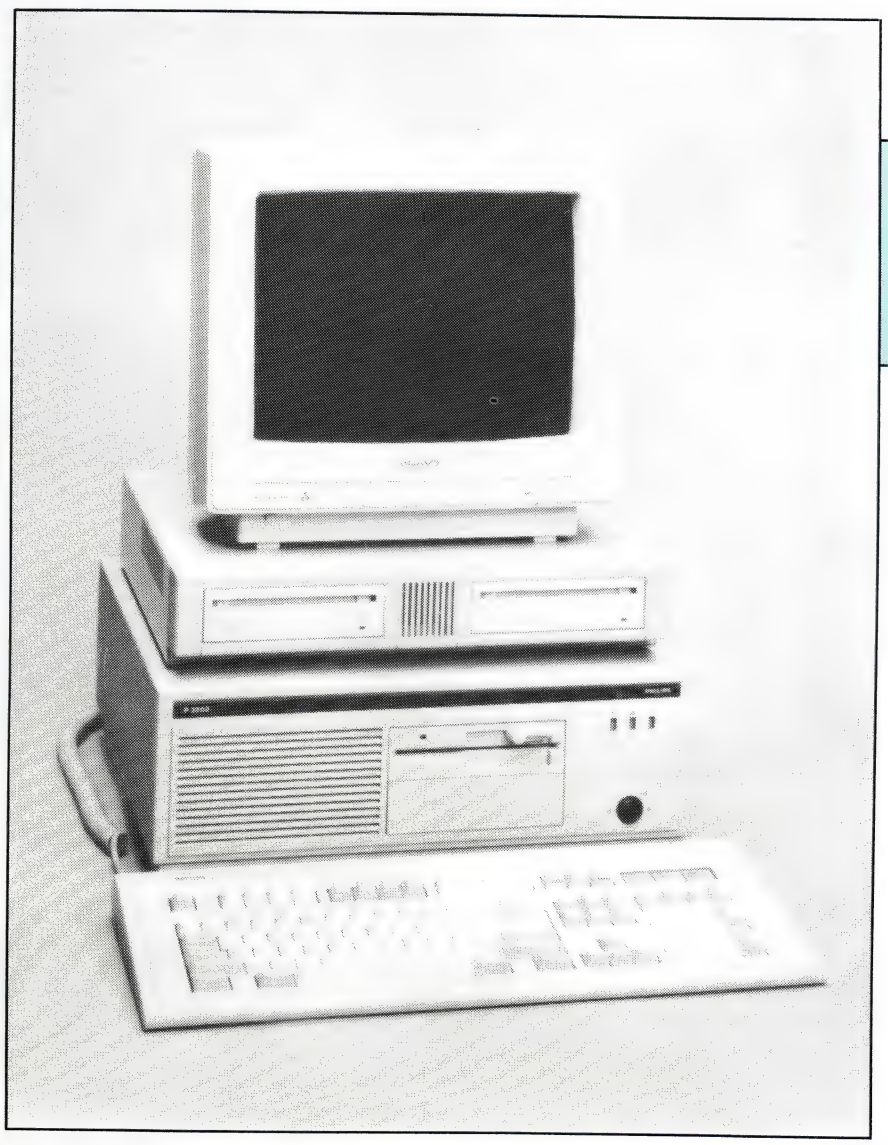
Two years ago, at the First International Conference on CD-ROM, there was much more to hear about than to see. Last year, at the Second International Conference, there was a dramatic increase in exhibitors and products on the show floor. This year, the exhibit area was doubled in size over last year, to accommodate the much greater number of exhibitors and products available for perusal and review. Some of the highlights of the show follow:

Link Forecasts Sharp Takeoff for CD-ROM

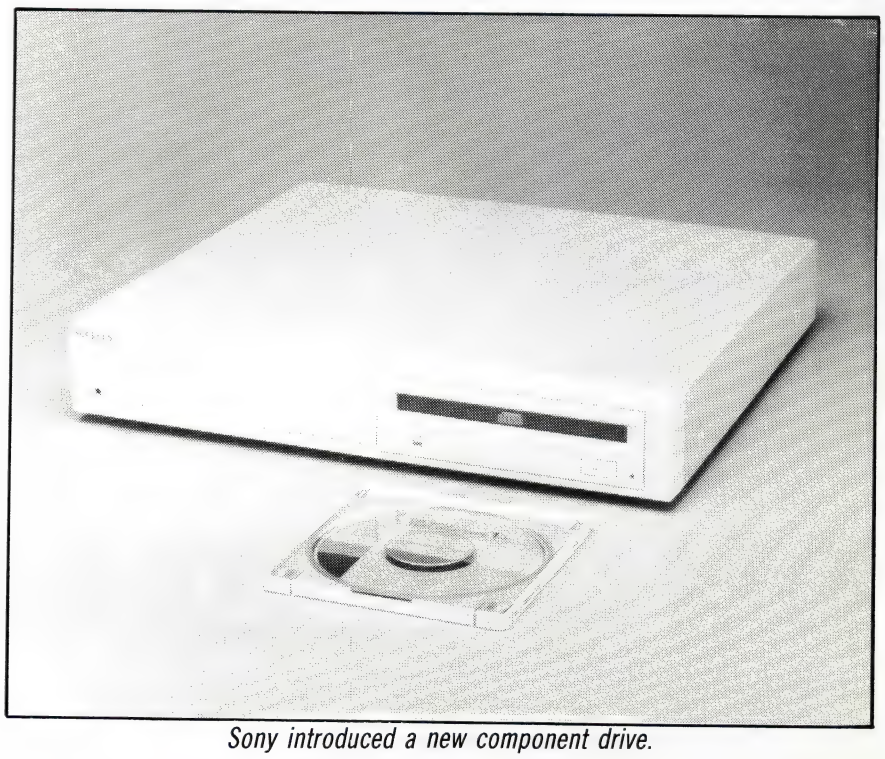
At a private client briefing session held just before the start of the Microsoft Conference, LINK Resources unveiled findings of its most recent efforts to size and forecast the CD-ROM and CD-I industries. Presentations were delivered by Steven Sieck, vice president Electronic Services, and David Rosen, director of LINK's Electronic Entertainment Program.

Sieck discussed LINK's new CD-ROM forecast model, which places net U.S. customer expenditures for the industry's products and services in 1987 at about $85 million, several times the previous year's performance. The electronic services research and consulting company sees fastest growth (153 percent) occuring in 1989, on the way to an industry total of $2.25 billion in 1992.

continued on page 21



LMS CM132 desktop unit features dual CD- ROM drives for total capability.



Sony introduced a new component drive.

Conference continued from page 20

"A split view of how we see the industry developing," said Sieck, "shows that content ownership and packaging, disk replication, and application and authoring services will account for four-fifths of industry revenues by 1992." The remainder, almost $300 million, will go for CD-ROM drives, licensed software packaged with the disks, authoring systems, and the latest on the scene, CD-servers—specialized products for optimizing users' access to CD-ROM data via local area networks.

"CD-servers and the role of LANs in CD-ROM/workstation connectivity will have a very significant impact on the development of corporate, library, and educational markets," Sieck said. Internal government and corporate CD-ROM applications are expected to account for the largest number of actual drives at the end of five years, but commercial database publishing activities will generate the most money for suppliers. "By then close to $2 billion will be spent annually for commercially-marketed databases and software delivered on CD. And that's excluding a 'product-associated segment'—information on CD-ROM that complements the use and maintenance of other, primary systems and services—which more than any other part of the market is poised for explosive growth this year."

David Rosen, Director of LINK's Electronic Entertainment Program, presented tamer projections for the consumer interactive disk market for the same period. "Current trends in the consumer market suggest a slow consumer adoption of interactive CDs through 1992," said Rosen, basing his analysis on LINK's annual tracking surveys of consumer purchasing and usage of products and services including CD players and disks, personal computers, and VCRs.

Slide tray adds extra protection for disks.

Rosen, the executive editor of CD-I News, sees CD-I getting off to a slow start. "We expect to see the first CD-I players on the market by the end of 1988," he said. "Product launch will really happen in 1989, with first-year sales of about 75,000 units."

"Pricing remains the real unknown, with so much depending on the state of the U.S. and world economy, and the yen/dollar ratio," he added. LINK expects CD-I software sales (excluding promotional tie-ins) in the U.S. to reach 3.7 million disks in 1992.

DVI Format Continues To Advance

GE's DVI Technology Venture demonstrated new real-time video compression capabilities and enhanced system features for its Digital Video Interactive (DVI) technology at the Conference. Application development and delivery systems were also shown.

The new Edit-Level Video (ELV) capability was demonstrated by recording the performance of a live juggling act on stage, compressing it instantaneously, and playing it back in real-time. ELV is a valuable tool application developers can use to interactively experiment with a variety of video scenarios on their DVI development system without incurring the time and expense involved in post-production editing. Then the developer need only apply the off-line presentation level video compression process to those motion sequences selected for the final application.

High resolution still images, compressed directly on the DVI system in one or two seconds, were also shown. Compression ratios from 7-to-1 up to 25-to-1 can be interactively selected. Exact reproduction, with no quality loss, required for graphic illustrations medical applications, is also possible with compressions between 2- and 3-to-1.

Significant advances in full-motion video quality were also demonstrated. These advances were accomplished solely through software improvements, pointing to the advantages offered by the fully-programmable, flexible DVI technology platform.

Two new DVI systems were shown for the first time. The DVI Application Delivery System is a combination of video, audio and utility boards designed to run in an IBM PC-AT or compatible computer. End users will

continued on page 53

IBM And Verbatim Announce New WORM Drives

by Ted Drude

While advances in CD-ROM continue to dominate the headlines, WORM (write-once, read-many) technologies are also starting to come to market. IBM introduced their first optical WORM drive for the PC and PS/2 in 1987, the Model 3363 Optical Storage Drive. Verbatim (now a subsidiary of Kodak) has revealed that it's working on its own version of a WORM disk drive, for release later this year.

IBM's 3363 Worm Optical Storage Drive

The IBM 3363 drive has approximately 200 Megabytes of storage, more than 550 times the capacity of a standard 360K floppy. The drive is available in two different versions. One is mounted internally for the PS/2 Models 60 and 80. The other version is mounted externally and works with the Model 30, 50, and standard XT/AT bus machines. Both versions of the 3363 were announced at a $2950 price.

The main advantage of the 3363 over a conventional Winchester drive is its removable disk cartridge. As IBM states, "Customers can use the small removable WORM disks to store and retrieve large amounts of data, such as sets of technical manuals, catalogs, or company historical documents". This sounds like a descrition of applications traditionally thought to be best handled by CD-ROM. IBM apparently feels that their WORM drive is a better way to go.

A clear advantage of WORM over CD-ROM is that the disks can be produced without the use of a disk mastering facility, and it can also be used as a back-up device for "large fixed disks". A disadvantage of both IBM's WORM and CD-ROM drives are their slow data access speeds. Both are considerably slower than Winchester drives.

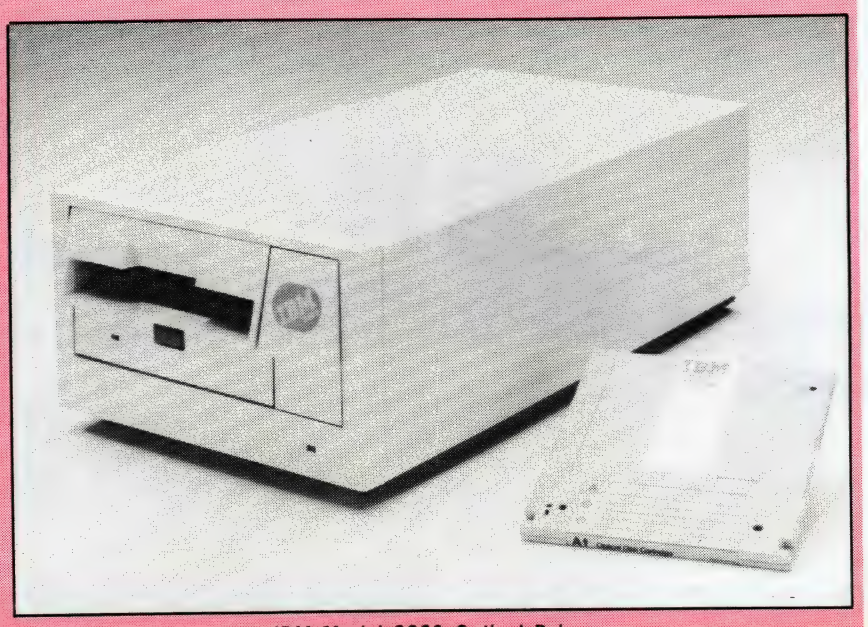
Verbatim's WORM Project

Verbatim is expecting to ship their new WORM drive in 1988. The Verbatim WORM has a 3.5 inch form factor, also using a removable disk cartridge. The disks will contain 50 Megabytes of data each, considerably less than either CD-ROM or IBM's 3363 WORM. However, the Verbatim drive has an advantage, in that it will have relatively fast access speed for an optical drive. Verbatim states that their disk's data access peformance will be about as good as a mid-range Winchester drive.

Price hasn't officially been set on the Verbatim disk cartridges yet, but rumors are floating around that they might be available for under $50. If so, this drive may find a strong niche as a very cost-effective, and yet reasonably good performing optical disk storage media.

The Verbatim WORM drive will be available in both PC-bus and SCSI interfaces, allowing it to be integrated into existing personal computers. Verbatim is targeting OEM and VAR vendors as likely markets for their drives. They haven't made it clear whether they'll be selling the drives under their own name or not. For more information the WORM drive, contact Verbatim at 435 Indio Way, Sunnyvale, CA 94086 (408) 773-5777.

Both IBM and Verbatim's announcements show that WORM storage is definitely coming to market, after years of development work. The technology is finally becoming practical enough to be used in actual products, not just prototypes for trade shows. While CD-ROM will probably continue to grab the major headlines in optical storage technology for a while, its long term future may not be as rosey. Just as the read-only video laserdisk suffered when read/write VCRs appeared in great numbers in the consumer marketplace, WORM drives may eventually overshadow CD-ROM. ●



IBM Model 3363 Optical Drive.

Zenith's New Z-286 Low Profile Desktop System

by Ted Drude

Since IBM's introduced its PS/2 line, just a little over a year ago, the "second tier" of PC compatible manufacturers (Compaq, Zenith, and Tandy) have been reserved in their responses. The rumor mill says that each of the manufacturers is busy working on machines with MicroChannel bus architecture, but they've all been delayed by numerous legal and technical problems.

Zenith, however, isn't sitting still any longer. They have just introduced their first system since the PS/2's introduction: the Z-286LP (the "LP" stands for Low Profile). The Z-286 incorporates many PS/2-like features: its motherboard uses highly integrated custom chip circuitry, its RAM memory comes in SIMM modules, it has VGA compatible graphics, and it's designed to run either MSDOS 3.3 or OS/2 (also available from Zenith).

The Z-286's "Tech Specs" And System Overview

The base Z-286 comes with the following standard equipment: an 8Mhz 80286 CPU, 1Megabyte RAM, 40 Megabyte 3.5 inch Winchester (28 ms. access time), 1.44 Megabyte 3.5 inch floppy drive, and a VGA compatible video board. Preliminary base price (subject to change) is $3999.00. There is a one year warranty on the system, with parts and labor covered on a carry/ship in basis. Zenith is positioning the Z-286 directly between the PS/2 Model 50 and 60, in both price and capabilities.

You could think of the Z-286 as a machine with the power of a PS/2 Model 60, in a package about the same size and price of a Model 50. But, it's missing something: the MicroChannel bus. Zenith, like Compaq, is betting that the standard AT bus still has some life left in it, and they have chosen to stick with it for now. Even without MicroChannel, we're impressed with the Z-286. It's a solid performer, and compares favorably with the other high end 286-based machines on the market.

Zenith Low Profile is high on looks.

A Closer Look At The Hardware—The Motherboard

The Z-286LP is constructed with a highly integrated motherboard design. The main board is mounted at the bottom of the low profile case. Onboard is an 8Mhz 80286 CPU, and an obligatory socket in case you want to add an 80287 math coprocessor.

The main RAM memory is mounted on the motherboard in SIMMs (single inline memory modules). There are six SIMM sockets on the motherboard, which can use either 256K or 1 Meg SIMMs. Using 256K SIMMs, a total of 1.5 Meg can be installed on the motherboard. With 1 Meg SIMMs, a total of 6 Megabytes can be put on the motherboard. Of course total RAM can still be expanded to 16 Megabytes, by using external bus memory expansion boards in addition to the onboard RAM.

The SIMM RAM memory, however, has a big advantage over external expansion RAM. It runs with zero wait states. Zenith claims that their 8Mhz CPU, using zero wait states, has much better performance than 10Mhz 286 machines, using one wait state (like the IBM PS/2 Model 50 and 60). We ran PC Magazine's Laboratory Benchmark Series on both machines, and found these claims to be slightly exagerated (see Table 1).

While the Z-286's CPU was faster than a PS/2 Model 60 for some operations, it was slower on others. The overall benchmark differences between the two machines, in composite processing speed, was virtually nil. At best, we can call it a draw. At worse, you would probably never be able to notice the difference between them anyway.

Zenith has used another little trick on the Z-286 to speed up processing speed. The BIOS ROM code is copied to RAM at boot up time. From then on, all BIOS access are made from RAM instead of ROM. This eliminates the need for extra waits states when running BIOS routines. Zenith affectionately calls the technique "Slushware" and it does account for some increased system throughput.

Modular Expansion Bus

One of the main technical differences between the Z-286 and the PS/2s has already been mentioned: the lack of a MicroChannel bus. Zenith, along with Compaq, has chosen to stick with AT bus for now. The Z-286 uses a modular bus expansion system, which Zenith is famous for. The full-length AT bus slots (all three of them) aren't hardwired into the motherboard, but are connected via a special bus adapter.

The motherboard itself has only a single bus expansion slot, and the AT bus expander is plugged into it at a right angle. The bus expansion adapter then sticks up from the motherboard, creating a three slot AT bus in the system unit box. Expansion cards are mounted parallel to the motherboard, keeping the overall system profile very low, but allowing even full height AT cards to be inserted (unlike many "Baby AT" cases on the market).

The Z-286's video card fills the lowest AT slot, so that leaves only two open for expansion. That's much less than most full-sized AT clones, but of the I/O ports are now integrated on the motherboard. This includes a parallel port, two serial ports, a CMOS clock/calendar, a floppy disk controller, and hard disk controller. At the lower back of the enclosure, a DB-25 is found for the parallel connector, and two DB-9's for the serial ports. The floppy/hard disk controller circuitry, embedded on the motherboard, allows IDS cables to be directly connected.

Although Zenith is mum about the possibilities, it's not inconceivable that the Z-286 could be converted over to MicroChannel architecture at a later date, with very little fuss. The AT bus adapter board could be replace with a MicroChannel bus adapter, or perhaps even a hybrd AT/MicroChannel bus adapter. At this point, however, only Zenith knows for sure...and so far, they aren't talking!

The Z-449 Video Board

Zenith has not tried to put the video on the motherboard of the Z-286—another difference between it and the PS/2. Instead, a normal bus video adapter, the Z-449, is used. The Z-449 is basically an modified EGA adapter, which has been expanded to include the VGA's high resolution mode (640x480). The lower resolution, 256 color modes of the VGA and MCGA are not supported by the Z-449.

For software compatibility, we have found the Z-449 to have very good compatibility with all EGA modes. Most software written for the VGA hi-res mode, and using proper BIOS calls, also worked fine. Some software, however, didn't recognize the Z-449 as a VGA compatible, instead defaulting to the EGA mode. We suspect, however, that VGA software which allows manual selection of video mode would work just fine.

The Z-286 comes with a video adapter, but without a video monitor. Zenith offers two models that are acceptable: the 1390 and 1490. The 1490 is Zenith's now famous flat screen monitor, which has no curve on the CRT face, and is highly recommended as a no-glare screen. The 1390 is internally similar to the 1490, but using a more conventional (and less costly)

continued on page 74

System Performance Comparison

PC Laboratory Benchmark Series Rel.4

	IBM PS/2 Model 60	Zenith Z-286
CPU Speed Test		
128K NOP	3.40	4.18
Do-Nothing	2.91	2.97
Integer Add	1.72	1.82
Integer Mult	0.97	1.10
String Sort	2.43	2.42
Prime Sieve	3.34	3.35
Disk Speed Test		
Seq Create	2.07	2.75
Seq Write	2.00	2.64
Seq Read	1.94	2.53
Rand Write	2.21	2.80
Rand Read	2.15	2.58

Table 1

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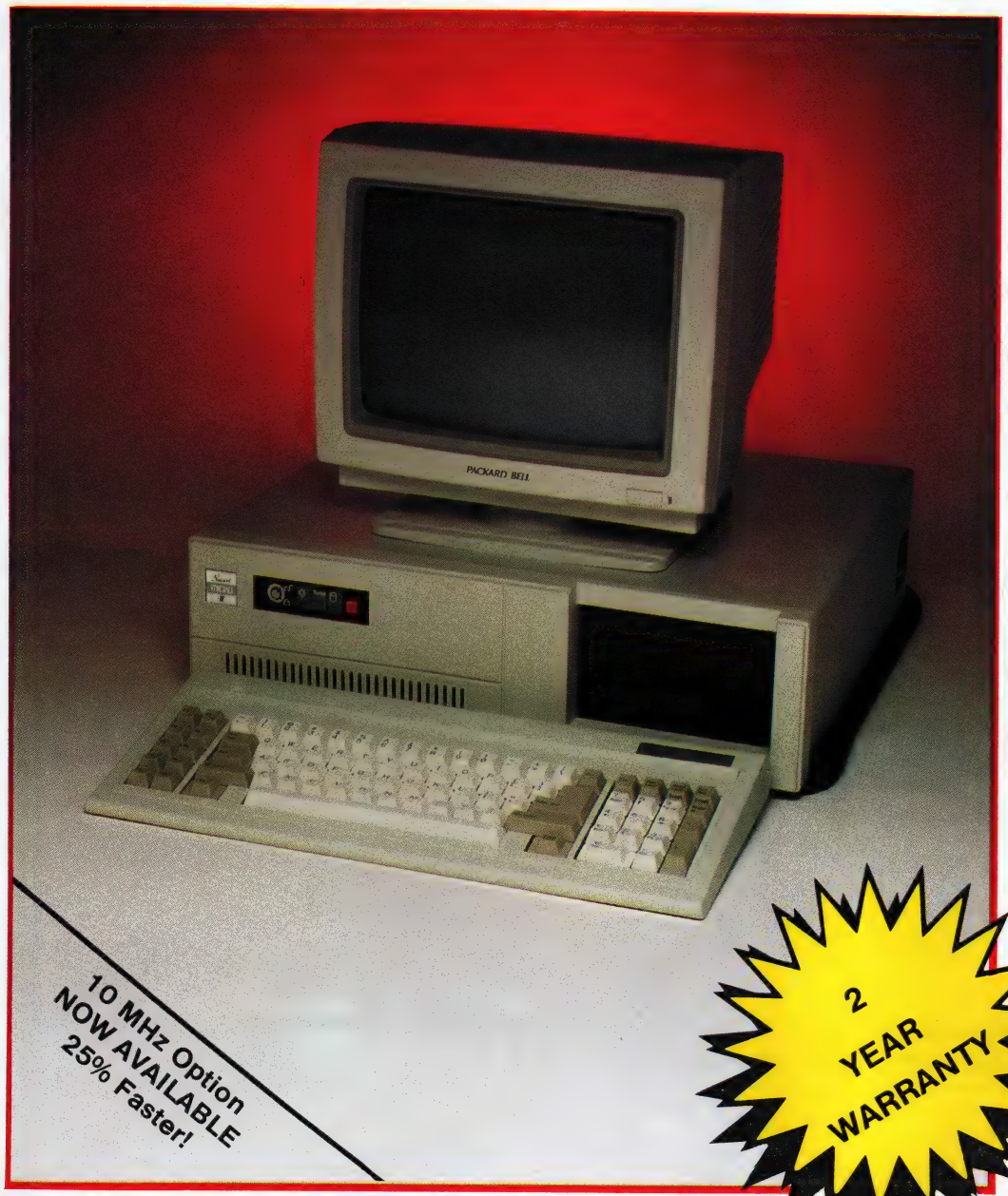

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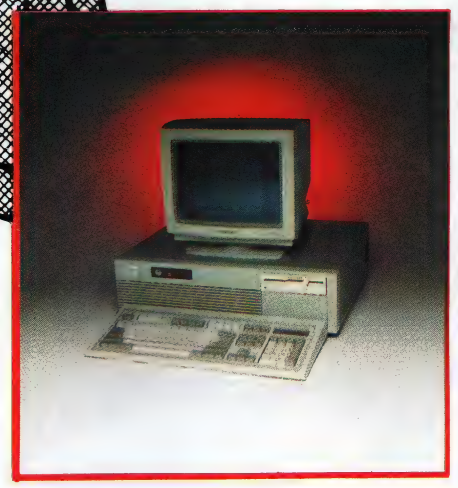

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DMP 386-16/20 Turbo

- ✓ 16/20 Mhz 386 Motherboard
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- ✓ 8 Hardware Expansion Slots
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Complete system price	**$2399**
System without monitor	2299
System with Samsung CGA color monitor	2599
System with NEC Multisync II EGA monitor	2999
System without hard disk drive	1799
Base System	1299

DMP 286- 6/12 Deluxe Baby Turbo

- ✓ 6/12 Mhz 286 Baby AT Motherboard
- ✓ 0 Wait States
- ✓ Phoenix Bios - #1 In Compatibility
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- ✓ 1.2MB Floppy Disk Drive
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- ✓ 80287 Co-processor Ready
- ✓ 12" Hi-res TTL Monochrome Monitor with Tilt/Swivel Base
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- ✓ 8 Hardware Expansion Slots
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Complete system price	**$1299**
System without monitor	1199
System with Samsung CGA color monitor	1499
System with NEC Multisync II EGA monitor	1999
System without hard disk drive	899
Base System	499

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DMP 286-6/12 Standard Turbo

- ✓ 6/12 Mhz 286 AT Motherboard
- ✓ 0 Wait State
- ✓ Phoenix Bios - #1 In Compatibility
- ✓ 40MB Hard Disk Drive
- ✓ 1.2MB Floppy Disk Drive
- ✓ 80286-12 Dual Speed Processor
- ✓ 80287 Co-processor Ready
- ✓ 12" Hi-res TTL Monochrome Monitor with Tilt/Swivel Base
- ✓ 256K RAM Memory
- ✓ Standard AT-style Case - Nickel-plated, Beige
- ✓ Turbo, Power and Disk LED Lights
- ✓ Heavy Duty 200 Watt Switching Power Supply
- ✓ Audio Speaker
- ✓ Clock Calendar with Battery Back-up
- ✓ Hardware Reset Switch
- ✓ 8 Hardware Expansion Slots
- ✓ Hercules-compatible Monochrome Graphics Card
- ✓ 102 Key AT-style Keyboard with LED Lights
- ✓ Hard Disk and Floppy Disk Controllers
- ✓ Keyboard Keylock with 2 Keys
- ✓ Parallel Printer Port
- ✓ 48 Hour Burn-in and Diagnostic Testing
- ✓ 100% IBM Compatibility
- ✓ Comprehensive 1 Year Parts and Labor Warranty
- ✓ 1 Year Free Technical Support
- ✓ Complete Component - level Documentation

Complete system price	**$1349**
System without monitor	1249
System with Samsung CGA color monitor	1549
System with NEC Multisync II EGA monitor	2049
System without hard disk drive	949
Base System	549

DMP XT-4/10 Standard Turbo

- ✓ 4.77/10 Mhz 8088 XT Motherboard
- ✓ Phoenix Bios - #1 In Compatibility
- ✓ 20MB Hard Disk Drive
- ✓ 360KB Floppy Disk Drive
- ✓ 8088-2 Dual Speed Processor
- ✓ 8087 Co-processor Ready
- ✓ 12" Hi-res TTL Monochrome Monitor with Tilt/Swivel Base
- ✓ 256K RAM Memory - 1MB Maximum
- ✓ XT-style Case - Nickel-plated, Slide
- ✓ Turbo, Power and Disk LED Lights
- ✓ Heavy Duty 150 Watt Switching Power Supply
- ✓ Audio Speaker
- ✓ Clock Calendar with Battery Back-up
- ✓ 8 Hardware Expansion Slots
- ✓ Hercules-compatible Monochrome Graphics Card
- ✓ Composite Video Adaptor
- ✓ CGA Color Graphics Adaptor
- ✓ Microsoft Bus Mouse-compatible Interface
- ✓ Parallel Printer Port
- ✓ Game Port
- ✓ Light Pen Interface
- ✓ Serial RS232C Port
- ✓ Hard & Floppy Disk Controllers
- ✓ 84 Key XT-style Keyboard with LED Lights
- ✓ 48 Hour Burn-in and Diagnostic Testing
- ✓ 100% IBM Compatibility
- ✓ Comprehensive 1 Year Parts & Labor Warranty
- ✓ 1 Year Free Technical Support
- ✓ Complete Component-level Documentation

Complete system price	**$849**
System without monitor	799
System with Samsung CGA color monitor	999
System with NEC Multisync II EGA monitor	1599
System without hard disk drive	549
Base System	189

DMP XT-4/10 Deluxe Turbo

- ✓ 4.77/10 Mhz 8088 XT Motherboard
- ✓ Phoenix Bios - #1 In Compatibility
- ✓ 30MB Hard Disk Drive
- ✓ 360KB Floppy Disk Drive
- ✓ 8088-2 Dual Speed Processor
- ✓ 8087 Co-processor Ready
- ✓ 12" Hi-res TTL Monochrome Monitor with Tilt/Swivel Base
- ✓ 256K RAM Memory - 1MB Maximum
- ✓ Mini AT-style Case - Nickel-plated, Beige
- ✓ Turbo, Power and Disk LED Lights
- ✓ Hardware Reset Switch
- ✓ Hardware Turbo Switch
- ✓ Heavy Duty 150 Watt Switching Power Supply
- ✓ Audio Speaker
- ✓ Clock Calendar with Battery Back-up
- ✓ 8 Hardware Expansion Slots
- ✓ Hercules-compatible Monochrome Graphics Card
- ✓ Composite Video Adaptor
- ✓ CGA Color Graphics Adaptor
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- ✓ Light Pen Interface
- ✓ Serial RS232C Port
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- ✓ 48 Hour Burn-in and Diagnostic Testing
- ✓ 100% IBM Compatibility
- ✓ Comprehensive 1 Year Parts & Labor Warranty
- ✓ 1 Year Free Technical Support
- ✓ Complete Component-level Documentation

Complete system price	**$899**
System without monitor	849
System with Samsung CGA color monitor	1099
System with NEC Multisync II EGA monitor	1649
System without hard disk drive	599
Base System	199

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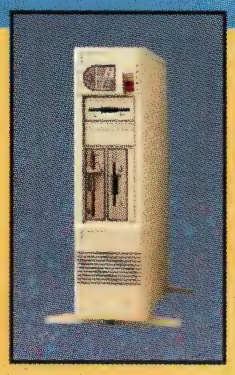

Optional

CPU 386/20
Monitor Not Included

CPU 386/16
Monitor Not Included

CPU 286/P
Includes LCD Display

	CPU 386/20	CPU 386/16	CPU 286/P
Standard Features			
CPU	80386-20	80386-16	80286-12
Clock Speed (MHz)	8/16, 10/20	8/16	6, 8/12
Wait State	Zero	Zero	Zero, Norton V3 SI rating: 15.3
RAM	1MB static column	1MB static column	512K DRAM (80ns)
On Board Expansion Memory	Up to 4MB	Up to 4MB	Up to 4MB
System Expansion Memory	Up to 12MB	Up to 12MB	Up to 16MB
Math Co-Processor Support	80287/80387	80287/80387	80287
Controller Card Handles	2 hard disks, 2 floppies	2 hard disks, 2 floppies	1 hard disk, 1 floppy
Disk Drive(s) Included	1.2MB floppy drive	1.2MB floppy drive	20MB hard drive, 1.44MB floppy drive
Clock/Calendar	Yes	Yes	Yes, with 10-year battery life
Ports	2 serial, 1 parallel, joystick adapter	2 serial, 1 parallel, joystick adapter	2 serial, 1 parallel, joystick adapter
Expansion Slots	1 32-bit memory bus, 5 16-bit, 2 8-bit	1 32-bit memory bus, 5 16-bit, 2 8-bit	3 16-bit, 2 8-bit
Keyboard	101-key enhanced	101-key enhanced	86-key
Power Supply (watts)	200	200	200
Reset Switch	Yes	Yes	Yes, with 2-second safety delay
BIOS	Award 32-bit ROM	Award 32-bit ROM	Phoenix
Warranty	1 year	1 year	1 year
System Configurations			
Monochrome System w/Hard Drive	$2,735 $3,130 (40MB)	$2,035 $2,430 (40MB)	n/a $1,795 (20MB)
EGA System w/Hard Drive	$3,185 $3,580 (40MB)	$2,485 $2,880 (40MB)	n/a n/a
Special Note	Also available as CPU 386/20 Tower (optional). Made in U.S.A.	Also available as CPU 386/16 Tower (optional). Made in U.S.A.	22-pound portable includes 20MB hard drive and Supertwist EL backlit LCD. Made in U.S.A.

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Better By Desire.

CPU 286/12

Monitor Not Included

CPU 286/10

Monitor not included

CPU TURBO XT

Includes Monochrome Monitor

	CPU 286/12	CPU 286/10	CPU Turbo XT
Standard Features			
CPU	80286-12	80286-10	8088-1
Clock Speed (MHz)	6, 8/12	6, 8/10	4.77/10
Wait State	Zero, Norton V3 SI rating: 15.3	Zero, Norton V3 SI rating: 11.5	Zero
RAM	512K DRAM (80ns)	512K DRAM (100ns)	640K
On Board Expansion Memory	Up to 4MB	Up to 4MB	Up to 640K
System Expansion Memory	Up to 16MB	Up to 16MB	Up to 8MB EMS
Math Co-Processor Support	80287	80287	8087
Controller Card Handles	2 hard disks, 2 floppies	2 hard disks, 2 floppies	2 floppies
Disk Drive(s) Included	1.2MB floppy drive	1.2MB floppy drive	360K floppy drive
Clock/Calendar	Yes, with 10-year battery life	Yes, with 10-year battery life	Yes
Ports	2 serial, 1 parallel, joystick adapter	2 serial, 1 parallel, joystick adapter	1 serial, 2 parallel, game port
Expansion Slots	6 16-bit, 2 8-bit	6 16-bit, 2 8-bit	8 8-bit
Keyboard	101-key enhanced	101-key enhanced	84-key standard
Power Supply (watts)	200	200	150
Reset Switch	Yes, with 2-second safety delay	Yes, with 2-second safety delay	Yes
BIOS	Phoenix	Phoenix	DTK
Warranty	18 months	18 months	1 year
System Configurations			
Monochrome System w/Hard Drive	$1,135 $1,530 (40MB)	$1,035 $1,285 (20MB)	$595 $890 (20MB)
EGA System w/Hard Drive	$1,585 $1,980 (40MB)	$1,485 $1,735 (20MB)	$1,045 $1,340 (20MB)
Special Note	Features Selectable System Bus Timing for add-on board compatibility. Made in U.S.A.	Also available in optional full size case with five drive bays. Made in U.S.A.	$595 Complete. Includes 12" high resolution monitor and Hercules compatible graphics card.

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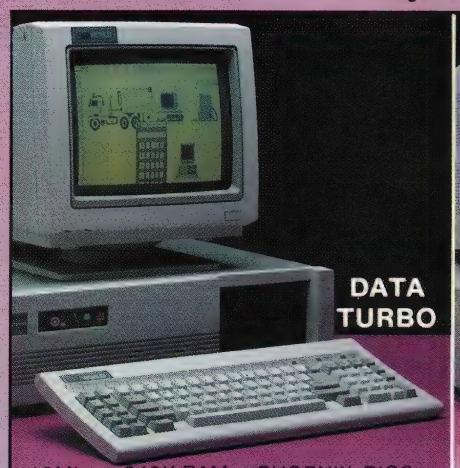

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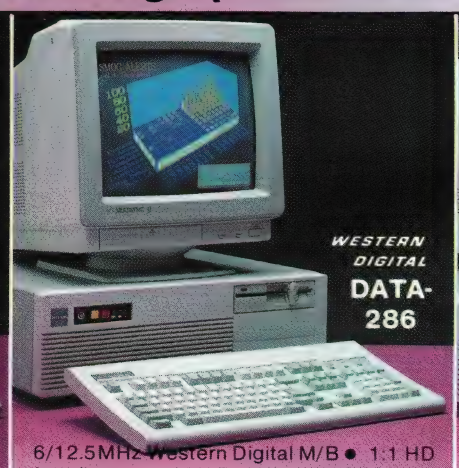

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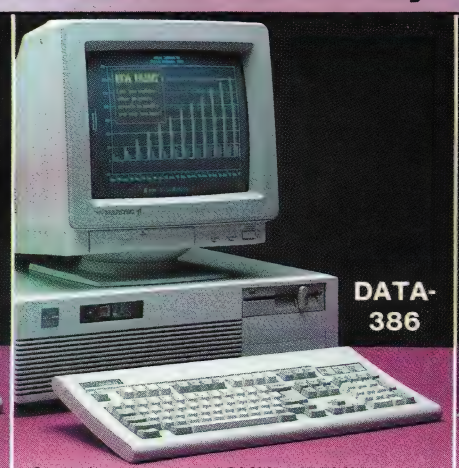

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The Northgate 386 Tower

Excellent Performer, Excellent Price

Reviewed by Andrew M. Fried

Times are changed. Not too terribly long ago, a computer mail order house catered to a highly select group of hard core "hackers"—the people who would stay up all night hacking at their keyboard writing programs.

What happened since then? Well, the small mail order business got larger and the mail order business became infinitely more respectable.

Today, Fortune 500 companies routinely order computer equipment through the mail. Little stores do, too. So do government agencies, schools, banks, and the list goes on. Yes, the hackers are still around but they represent a miniscule amount of today's mail order business.

It's not surprising, then, that many mail order firms are taking advantage of the maturation of the industry and doing what was unthinkable only three years ago, manufacturing and selling expensive, high quality business systems in a market previously reserved exclusively for the hobbyist type end user.

There are several companies in this class that come to mind, and Northgate is one of them. These companies have created specific product lines geared primarily towards the small business environment rather than the low cost home market.

This review is about such a product—the Northgate 386 Tower. At a cost of more than $3,000, it's definitely not being marketed to the average home user. On the other hand, it's advanced features and exceptionally high performance makes this machine an excellent choice for a business that demands high speed computational power for applications such as file servers, CAD workstations and software development.

System Configuration

The Northgate 386 Tower is a 32 bit, 80386 based machine which uses the Mylex motherboard and a ROM BIOS produced by American Megatrends. The motherboard operates at a 16MHz clock speed, although a 20MHz system board is also available for approximately $700 more.

The 16MHz unit is shipped complete from the factory and includes the upright tower case, one megabyte of RAM on the motherboard along with an additional 64K static RAM caching system, a 1.2 megabyte 5¼" floppy disk drive, a 3½" 1.44 megabyte disk drive, a Miniscribe 3675 65 megabyte fixed disk drive with an Adaptec RLL 16 bit fixed disk/floppy controller card, two serial ports, one parallel port, a 14" high resolution monochrome monitor complete with a tilt and swivel base, a Hercules compatible graphics card, and the famous Northgate Omni-Key 102 keyboard.

Of particular interest is the on-board cache memory. This memory, which uses zero wait state, 35 nanosecond, static RAM chips permits the system to increase overall efficiency by as much as 400%. Although it is supported, this memory is not included in the one megabyte which comes standard with every system.

The standard memory used on the system board consists of the familiar 41256-120 chips used by many AT style clones. If you so desire, up to four megabytes of memory can be placed directly on the motherboard. To do so, however, would require you to remove the existing chips and replace them with one megabyte chips. Northgate offers this upgrade for an additional $1100.

While some of the advertisements would lead you to believe that the motherboard operates with zero wait state, it does not. The cache memory, which under normal conditions is used approximately 85% of the time, consists of no wait state static RAM memory. The memory on the motherboard, however, uses two wait states.

Northgate bundles a set of software with every system they sell. Included with all 386 Towers is the MSDOS 3.3 operating system, GWBASIC version 3.30A, a disk cache program and a disk optimization program from Golden Bow Systems called VOPT.

Northgate advertises numerous options for the 386 Tower; among them are 4 megabyte memory upgrades for $1100, 20MHz CPUs for $700 and an EGA monitor and card for $495. In addition, fixed disk drives with up to 300 megabytes are available as are SCSI interfaces.

The Warranty

I usually make mention of the manufacturers warranty at the end of my review. This time, however, I feel it is worth mentioning up front.

Northgate provides a one year parts and labor warranty on their 386 Tower. In addition, Northgate offers an overnight parts replacement guarantee that reads, "In the event of failure of a part that disables the system, Northgate will ship, the same day if notified by 12 noon Central Time, a new replacement part." That has got to make it one of the best warranties in the business!

The Tower

I don't want to sound like Andy Rooney and ask, "Have you ever wondered why they call a sideways computer case a tower..." but I will. The Northgate 386 Tower is not the size of a filing cabinet nor is it much larger than it's AT style counterpart. Anyway, instead of calling it a sideways-upright-PC/AT-like case they decided to simply call it the Tower.

Unlike the AT style case, however, the Tower is able to support up to three half height external units (such as floppy drives) as well as two additional units inside the case. There are advantages to this type of design; foremost is the savings in desk space. On the other hand, I feel a floor mounted unit has certain disadvantages you need to be aware of.

Northgate Tower: plug and go with confidence.

To begin with, sitting on the floor exposes the unit to a lot more dust and dirt. With the help of the power supply fan and heating convection, this causes a dirty motherboard. A dirty motherboard, in turn, can cause problems ranging from overheating to corrosion.

Another problem with the Tower is that the monitor cable is far too short. In fact, the cable barely reached from the floor standing position to the tabletop. If you plan on placing the Tower in a convenient location, five will get you ten that you'll need to order a monitor cable extension. You may even need a keyboard extension depending upon how long the monitor cable is!

Finally, the floor mounted box left me with a real dilemma—how do I get the monitor up to eye level? I'm used to looking at a monitor that sits above my AT; looking down just doesn't seem natural! OK, so I am a little finicky.

Keyboard

This will probably get me some hate mail but I'll give you my thoughts concerning keyboards. I personally don't think that there has ever been a better keyboard than the original IBM PC keyboard that was introduced in 1974.

Ever since the first clone hit the market, one of the biggest shortcomings the clones had was that they were unable to duplicate the "Rolls Royce" feel that the IBM PC keyboard provided. For four years I have been reviewing computers, and for four years I have been complaining about problems with the keyboards on these clones. My most famous complaint, of course, was that the keyboards were generally "smooshy."

In other cases, the keyboards had either no tactile sensation or required you to press the keys so hard that it was almost like operating an old fashioned manual typewriter (anyone still

continued on page 74

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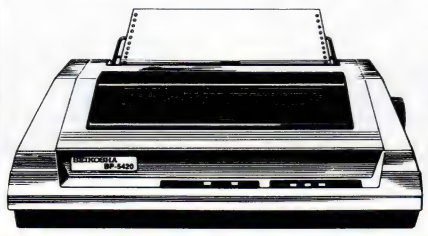

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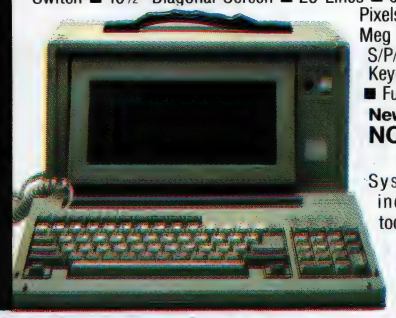

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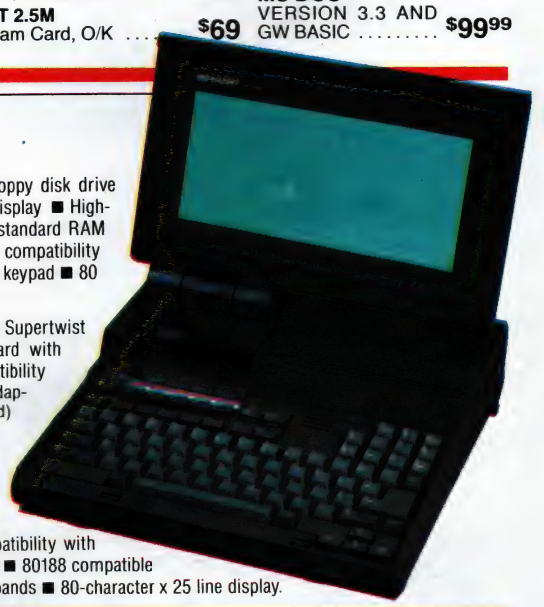

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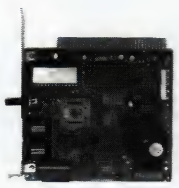

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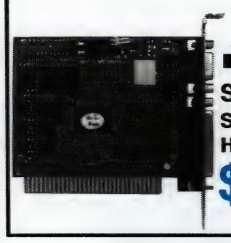

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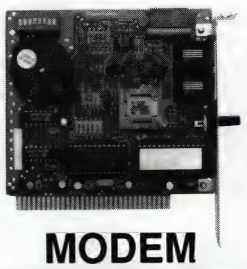

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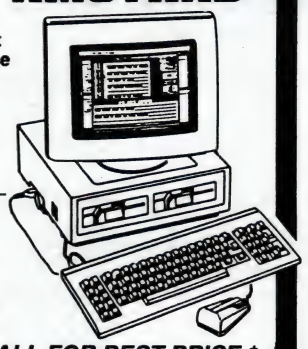

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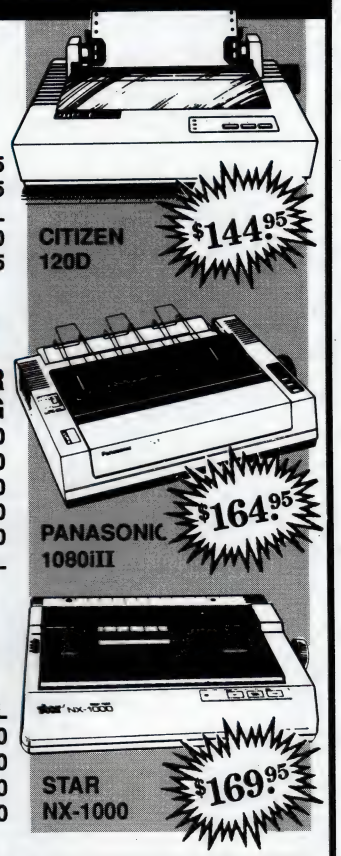

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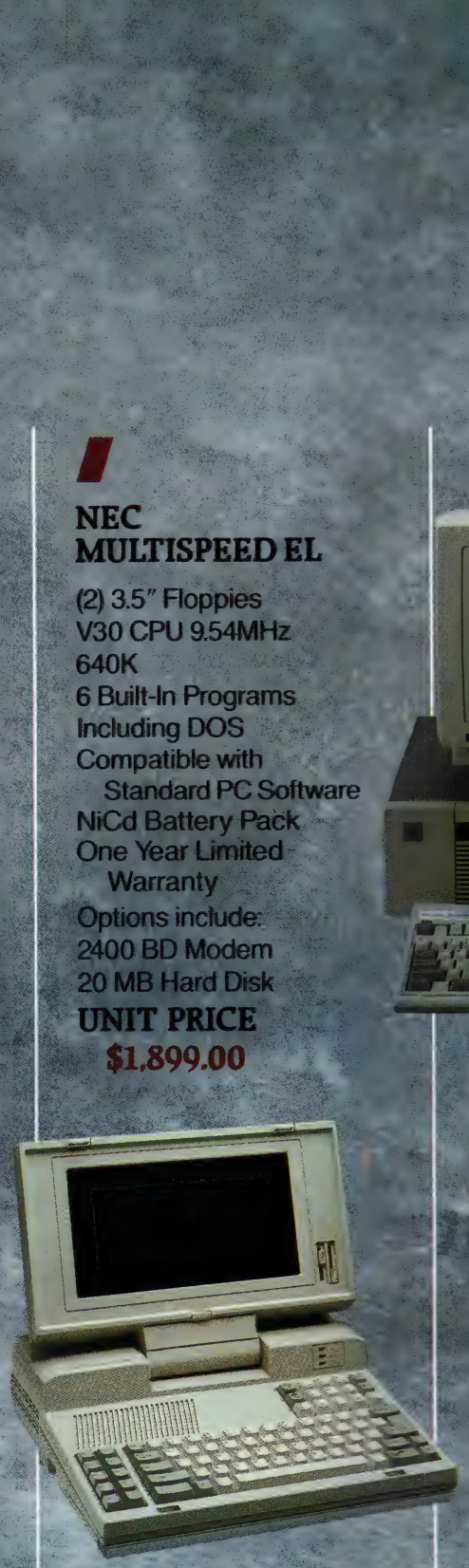

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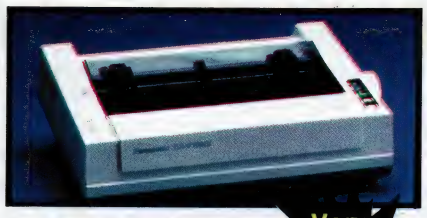

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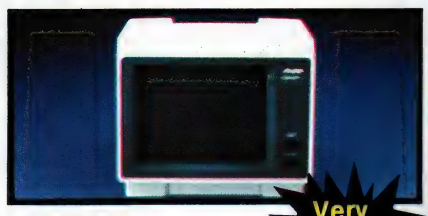

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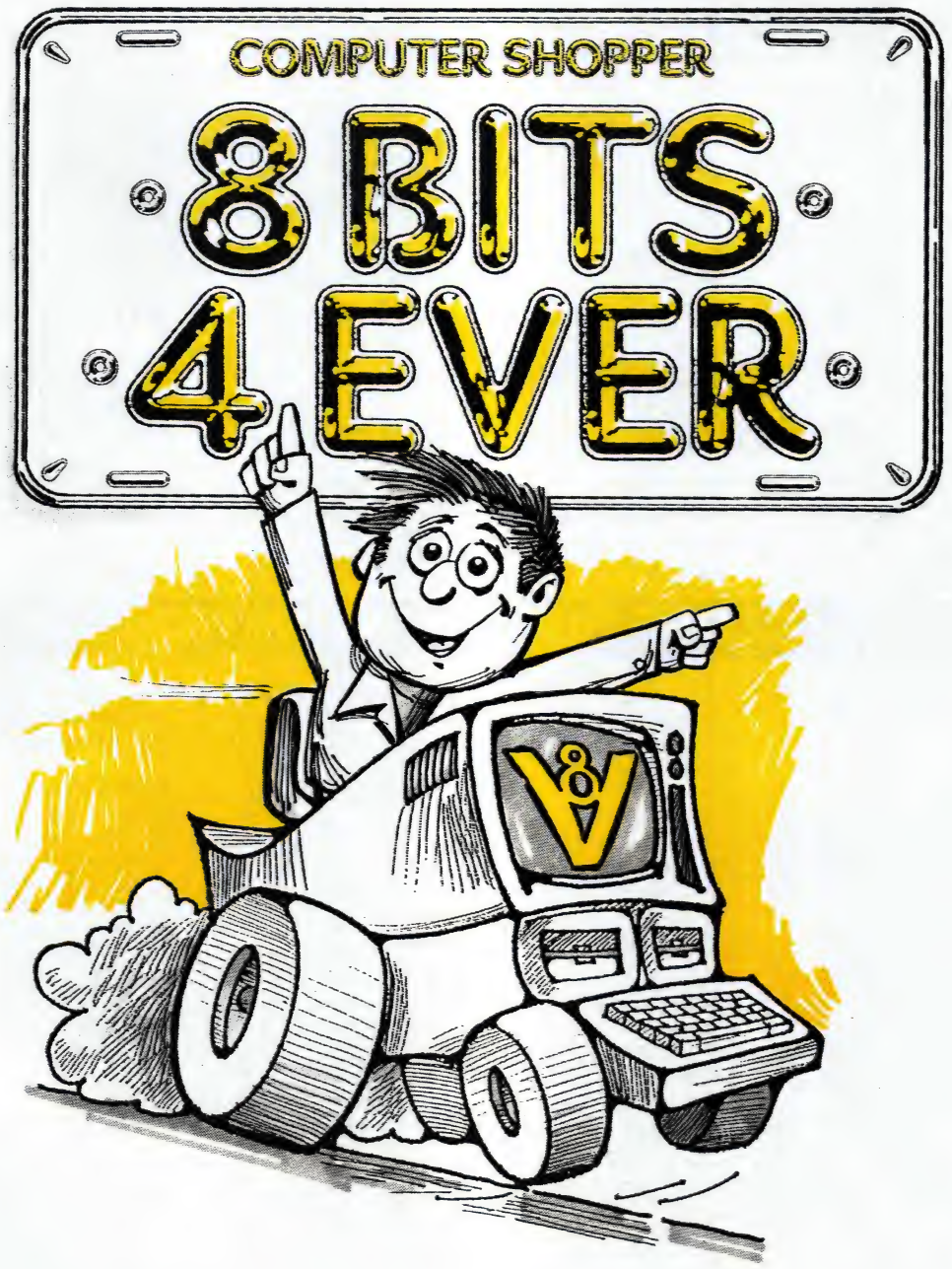
The State Of The Eight: 8-Bits Alive And Running

In a classic scene from a popular Star Trek episode, Dr. "Bones" McCoy looks down at a crumpled mass of organic matter, which is really an alien life-form, momentarily stunned by a phaser pistol. After scanning the alien body, McCoy realizes that it's still fully alive—even though it should have been killed instantly by the tremendous blast directed at it. McCoy whirls around, looks directly at Capt. Kirk and exclaims "By Golly Jim...it won't DIE!"

With the same incredulity, we often hear similar statements of disbelief: "I can't believe IT!" "Weren't 8-bit machines dead two years ago?" "Who in their right mind would still be using one of those things?" These are some typical statements often made by members of the "mainstream" computer press. Especially when they find out that a magazine the size of *Computer Shopper* not only devotes a large section of the magazine to 8-bit computers every month, but that the section is still growing!



Classic Computing

For years, *Computer Shopper* has run regular columns, and feature articles, for most 8-bit computers including Apple, Atari, Commodore, Tandy, Texas Instruments, Timex-/Sinclair, Heath/Zenith, and many other CP/M machines. While most other general interest computer magazines gave up on 8-bit machines years ago, *Computer Shopper* has continually maintained its commitment to them.

In late 1987, a new section appeared in *Computer Shopper*, called "Classic Computers." This section is reserved for some of the most popular 8-bit computers, whether in production or not. Our intent was to insure a continuing place for these systems, as long as there is sufficient reader interest.

From time to time, new columns may be added to Classic Computers and, eventually, some will be dropped. Our decisions on what to add or delete will definitely be influenced by reader feedback. (This month, due to popular demand, we are proud to announce the addition of a monthly Coleco Adam column.)

Let's Hear It From the Experts

Why are so many people still interested in Classic Computers? The reasons widely vary, but two are the most important: there is a large installed user base, and there are still huge amounts of good, inexpensive software for them. Despite their relatively slow processing power, and somewhat limited expandability, these computers can still be excellent choices for entertainment, education, home, and small business users. Since there is still a lot of interest in Classic Computers, we've decided to deliver a "State of the Eight" message to our *Computer Shopper* readers.

We asked some of our regular 8-bit contributors to provide a short summary of what's been happening in their particular area of expertise: Phil Chien (Apple II), Jeff Brenner (Atari), Don Eamon (C-64), Cheryl Peterson (C-128), Jonathan Zittrain (TI-99/4A), Mark Fendrick (Timex/Sinclair), and George Ewing (Heath/Zenith). (In addition, we've got some information about FOG, an international user group for users of Classic CP/M based systems.) As you can tell from the reports filed by our contributors, "Eight is still Great" and Classic Computers will probably be with us for quite a while to come.

Apple II

by Phil Chien

It seems appropriate that this month's cover story is on optical drives, since Apple recently introduced a CD-ROM drive which will work with both the Mac and the Apple II line. While Apple's main thrust is obviously toward the 16 and 32 bit machines, they sure haven't given up on the 8/16-bit Apple II family either. When Apple insures that their latest peripherals will work with the Apple II, it's a strong statement that they believe there is life left in them!

The best proof of the 8-bit Apple's popularity is its columns here in *Computer Shopper*. The Apple II is the only 8-bit machine which isn't in the "Classic Computers" section. No one doubts that the Apple II is a classic, but it's also an extremely popular machine which still sells well, and the only one which has a clear 16-bit upgrade path.

When the Apple II and II+ first appeared, Tandy was just starting to sell its Model I, Commodore had its PET, and most other manufacturers were selling some type of S-100 CP/M system. Question: "Where are they now ?" Answer: Most are either out of business, selling PC clones, or have totally switched product lines, leaving their original products behind long ago. Apple is the only company still selling, and supporting, computers which are based on the same basic platform originally marketed 10 years ago. Programs written years ago will usually run without any modification on the latest Apple IIgs.

So, what's been happening with the Apple II lately ? Well, in addition to the aforementioned CD-ROM drive, Apple has continued to support the IIe, IIc, and IIgs with high capacity floppy drives, ProDOS, and many other peripherals. Third parties have also kept pace by providing 16-bit (65816) co-processors, massive memory boards, high speed accelerators, IBM MSDOS emulators, and other exotic accessories.

The IIc's closed architecture makes it a little more difficult to expand, but that hasn't stopped third-party companies from introducing RAM cards, co-processors, and other peripherals for it as well. And speaking of the IIc, the Laser 128, a low-cost, partially compatible Asian clone of the IIc, is selling like hotcakes. Apple may have to lower the price on the real IIc or lose more sales.

So what's in the Apple II's future? There are lots of rumors. The IIc may be offered with a 3.5 inch, high density (1.6 Meg) flopppy drive. Apple may do a low end IIc using a Mega II chip (used in the IIgs) and less than 20 other chips! A SCSI port may be offered on the IIc and IIe. Apple may release another, much improved, LCD display panel for a truly portable IIc, and there also may be a portable version of the IIgs in the works. Which of these rumors will come true, and which are just dreams? Keep reading *Computer Shopper's* Apple II columns and find out!

Atari 8 Bit

by Jeff Brenner

The Atari 8-bit line consists of the original Atari 400 and 800, the 600XL, 800XL, 1200XL, 65XE, 130XE, and the new XE Game System. A common misconception about the 8-bit Atari computer line, is that the 8-bitters are "orphan" computers, abandoned by their manufacturer in favor of different (and more profitable) ventures. The shift of company attention and resources to the ST line has been cited as proof of Atari's apathy towards the 8-bit line.

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CD-ROM
continued from page 11

Now I believe that the combination of CD-ROM technology, multimedia, and personal computers will spark a new renaissance in communication and in education. And it will create a new community—not just of information sources, but of ideas. The age of information must give way to an age of knowledge and wisdom.

Information is merely signs and numbers, sounds and images. But knowledge involves their meaning. We must provide people with the tools to get at the meaning of all of this information and integrate it into their daily environment. So we need navigational tools which will bridge the gap between our natural and learned ability to manipulate information and the huge capacity of the CD-ROM.

We've found the library, now we need a librarian. Enter the personal computer.

Now that we've been living with personal computers for more than a decade, we're beginning to understand their impact on people and organizations. Computers, like paper, are a permanent part of the landscape. Each year, as computing technology continues to expand and refine itself, we see more opportunities for building toward a network of personal computers that truly serve the individual.

We've seen increases in the power and speed of our technology—with more MIPs, and more storage—and the rise of new applications to take advantage of that power. We've seen a commitment among manufacturers to establish standards in networking. And we've seen the personal computer become an indispensable tool for professional musicians, from Sting and Herbie Hancock to the Los Angeles Opera Company. We've seen the value of desktop publishing extend into the realm of desktop presentation.

There are students who are now in their first year of high school who have had computers in every classroom they've inhabited since kindergarten. And we've seen technical users begin to understand the value of an intuitive and graphic user interface. And nontechnical users demanding more computing power.

All of these changes are marked by a common objective: accessing, publishing, and distributing information, whether in words, pictures, or sounds. At Apple, the application of our own technology has revolutionized our business operations. What you see when you visit Apple is a Macintosh on every desk—and they're all connected—to local networks that share printing and file services, to local data sources like CD-ROM drives, to global electronic mail services that link all Apple offices, manufacturing sites, distribution centers, as well as key customers, developers, and vendors. And minicomputers and mainframes in 16 worldwide data centers.

All of us rely on Apple technology to do our jobs. From our security guards who connect into databases of company property, to personnel managers who access employee information from databases on a VAX. Even our design engineers use the Macintosh as a front end to our Cray supercomputer.

We've found that the personal computer is a more powerful tool for the individual when it can effectively connect to other data sources. And this ability to draw on a variety of resources is something we'll need more and more as we move toward the 21st Century. The pressures of rapid change, the compression of time to make decisions, and the cost to process transactions are making it increasingly necessary to have flexibility and accessible tools for managing information.

We believe the combination of CD-ROM technology and the personal computer can give us both—the tools and the information. And that's what makes CD-ROM a revolutionary medium. It's our desire to speed the momentum of this new medium, and we have one distinct advantage over the paper sellers of the 13th Century—a market that's as ripe as a Red Delicious apple in September.

One of the reasons it took so long for paper and printing technologies to spread was that most people couldn't read or write. The availability of paper and the invention of movable type gave rise to another revolution: literacy. As more people learned to read and write, the demand for paper increased.

Our vision of multimedia includes the development of new forms of communication drawing upon vast amounts of stored information in a variety of data types. But today we cannot expect our customers to invest in the equivalent of learning a whole new skill set like writing and reading in order to fulfill that vision. A central part of that vision is providing unrestricted pathways through an intuitive and graphic user interface. Our goal is to provide people with the freedom to share more than just data and facts, but ideas. CD-ROM is a logical extension of our focus on the individual.

Computer visionary Ted Nelson has been promoting the concept of "hypermedia" for almost three decades. Only now are we seeing commercial implementations of it. In the future we will have much more intuitive ways of navigating through enormous collections of information, combining text, graphics, sound, and motion.

Together these technologies will deliver more than information—they will provide tools that will allow exploration and provoke insight. And that is what we believe makes CD-ROM more than just a significant new medium—but a revolutionary one.

As I noted earlier, all great new technologies have a germination period. Many of the technologies present in our Macintosh and Apple II computers existed even before Apple was founded. In fact many of them also predate Xerox's PARC, and had their beginnings in university laboratories and the ARPAnet. If you look back to the early '60s at Ivan Sutherland's Sketchpad, you can see the roots for our conventions of drawing on screens. Yet it was 20 years from Sketchpad to the Macintosh. And if you look back to the mid '60s at Doug Englebart's NLS, or "Online System," you can find the origins of the mouse. And yet it was 15 years from NLS to Macintosh. If you look back to the early '70s at what Alan Kay, Adelle Goldberg, Dan Ingalls and others accomplished in developing Smalltalk, you can find early versions of windows, menus, and bit-mapped graphics. But it was more than 10 years from Smalltalk to Macintosh.

If you examine these early research projects carefully, you'll find many features and capabilities that are still waiting to be developed. It seems to be an incubation period that averages 15 years before advanced research can mature into commercial technology and find its way into the marketplace. And it seems to take that long whether the engineering is difficult or relatively simple.

Now things that we know that we want—like great flat panel displays—they take a long time to develop. And things which are relatively quick to engineer, like the mouse, or even paper, take a long time before we recognize that we want them.

So let's project that forward. If that 15-year time span continues to hold true, we can look into the advanced technology labs today for a glimpse of the kind of computer products that we'll be seeing early in the next century. By the year 2000, we'll still only be in year 15 of CD-ROM.

The computers we'll see will be connected in networks as seamlessly integrated as today's phone system. They will bring to any desktop—or even laptop—a view into libraries and databases around the world. They will combine text with visual and sound resources into hypermedia structures that deliver information with the fluidity of natural thought. And they will produce and display 3-D color animation that will help us visualize complex models with the same ease with which we now graph a column on a spreadsheet.

We'll use artificial intelligence to create software "agents" that recognize and anticipate our strategies and preferences, boosting our productivity.

Our (Apple's) vision is to be the leading innovator in personalized multimedia technology and products in the 1990s. Our mission as a company is to create cultural tools to empower individuals with new ways of learning, thinking, and working. To us, mainframes are nice peripherals.

CD-ROM, HyperCard, television-quality images, and artificial intelligence are core technologies for the future.

I see many new product and market opportunities ahead in business, education, and government. Our focus should not be on the technology alone, but on how it enables us to transform data into ideas and knowledge. We believe that today's personal computers, and those of tomorrow, will prove the best platform for us to develop experiences that are engaging, informative, and compelling.

What we've seen so far with personal computing and optical storage technology is a first step along unrestricted pathways to information, and multimedia experiences. With CD-ROM, we see a medium that can provide us with massive amounts of information and data. With personal computers, we're seeing more power and flexibility. With HyperCard, we have a tool that is developing on two parallel paths—first as the "dashboard" to huge amounts of data, and second as a development tool enabling authors and users to customize information. We want to provide consistent tools for the developer and the user to maximize their interaction with the medium. Apple intends to be a prime mover in shaping the cultural tools of tomorrow.

But we place great faith and reliance

continued on page 53

The Making Of A CD-ROM Disk

The same basic technology is used to make all prerecorded optical disks—audio CDs, CD-ROMs, and video disks. In each instance, four distinct steps occur:

1. Program Production. The original music, video, or data is recorded digitally and transcribed to produce a Master Tape.
2. Tape Mastering. The Master Tape then undergoes a conversion process during which additional information is generated and cue codes are added.
3. Disk Mastering. The information from the Tape Master drives a laser and is recorded on polymer photoresist that is coated onto the surface of a glass disk. A disk master is produced by developing and metalizing all of the recorded information in millions of microscopic pits.
4. Replication. By galvanic processing, the Disk Master surface is transferred onto nickel shells to form negatives and positives from which stamper copies are made for mass replication. Using an injection molding process, the information contained on the surface of the stamper is transferred to a transparent plastic disk. The disk is given a reflective aluminum coating, over which a protective layer of lacquer is applied. After the center hole is punched out, the optical disk is silk-screen labeled and packaged for shipment to the customer.

Write-once and reversible optical disks are made in a similar way, but require a different metal layer or layers so users can optically record their digitized data onto the disks. ●

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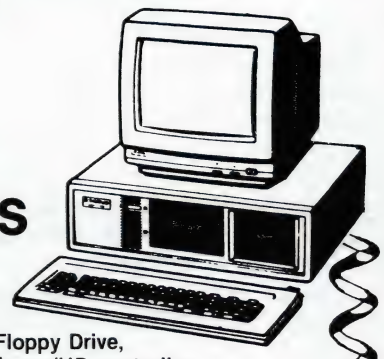

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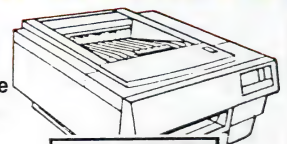

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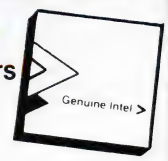

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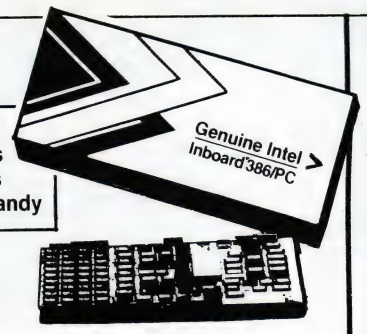

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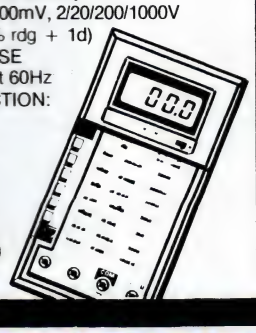

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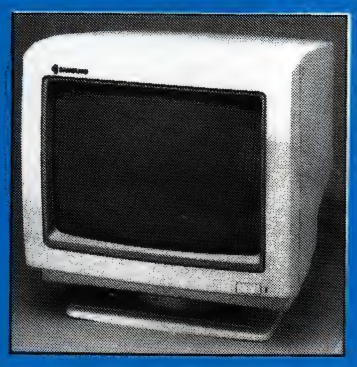

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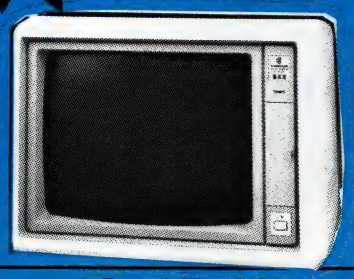

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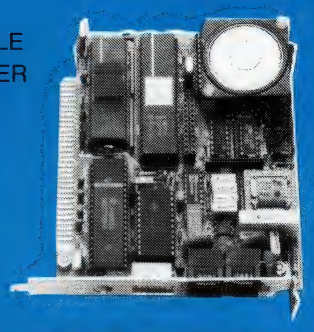

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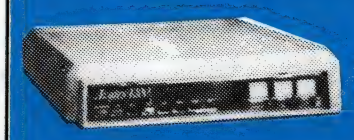

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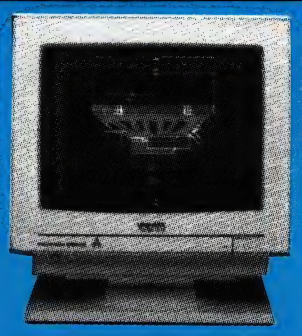

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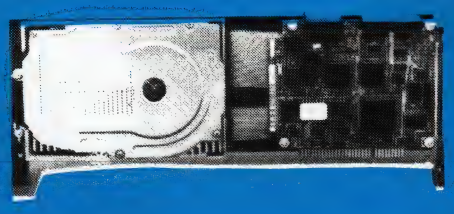

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Intel 80386-16 microprocessor, 16/8MHz keyboard selectable, 0 wait state, 1MB Ram, front panel reset switch, front panel access to 5 half-height drive bays, 1.2MB floppy drive, AT compatible keyboard, Everex AMI BIOS, clock/calendar with battery backup, 192 watt power supply, high quality monitor and one year limited warranty.

EGA System $2315
EGA card and EGA monitor

SCSI-286/8
Mono System with Printer $1195

80286 16 bit Intel CPU, AT style keyboard, 512K motherboard expandable to 1MB, Everex AMI BIOS, clock/calendar with battery backup, 1.2MB floppy drive, high quality monitor, STAR Micronics printer and one year limited warranty.

EGA System with Printer $1598
EGA card, EGA monitor and STAR Micronics printer.

Monographics

- Hercules graphics compatible
- 132 columns
- 720 x 348 **$85**
- Eversion 14" Flat screen
- 720 x 348 pixels
- Tilt & Swivel base **$138**

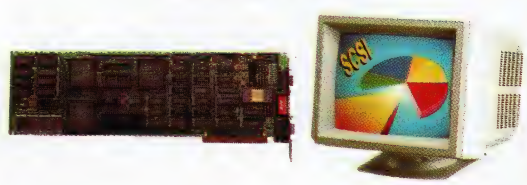
Monographic combo $180

EGA Video

- Micro Enhancer
- 640 x 350 EGA
- Parallel port (optional) **$149**
- Eversion 14" EGA
- 640 x 350 resolution
- Tilt & Swivel base **$390**

EGA Video combo $490

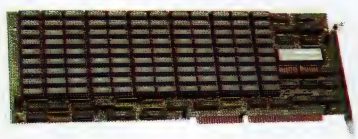
Super EVGA



- Supports EGA, CGA, Hercules, MDA software for PC/AT/XT
- All 17 VGA modes **$299**
- Multisync II monitor **$599**

Super EVGA combo $874

Multifunction



RAM 4000 for PS/2 4MB capacity, extended or expanded **$299**

Multifunction for AT
serial, parallel and game ports **$169**

Memory for PC
0-576K memory **$45**

Memory for AT
3MB, extend/EMS **$139**

Mini I/O for PC/XT/AT
2 serial ports (2nd optional) parallel port
for AT **$75** for XT **$79**

EMS for AT & XT
2MB expansion memory
for AT **$159** for XT **$99**

*All prices refer as ØK RAM installed.

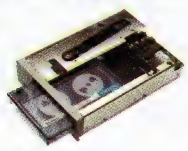
Hard Disk

Micropolis
28ms access time, voice coil technology, auto head parking, plated media, high quality, high storage and high performance
44MB **$575** 71MB **$865**

Other Hard Disk Drives

20MB Subsystem	$290	40MB Subsystem	$399
30MB Subsystem	$360	Seagate ST251	$520

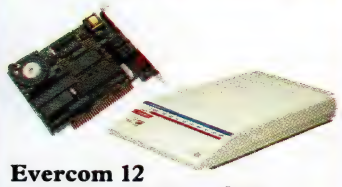
Everex Tape Backups



Backup 5MB in one minute, image/file by file, mounting hardware, software and tape, controller included.

	Int	Ext
60MB Cartridge	$757	$827
60MB Cassette	$650	$690

Everex Modems

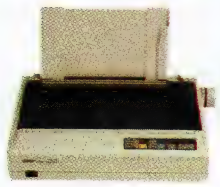


Evercom 12
300/1200 Baud internal **$99**

Evercom 24
300/1200/2400 Baud internal **$175**
external **$199**

All modems are Hayes compatible

Printers



STAR Micronics NX1000
- Multi fonts
- NLQ mode
- 120 CPS
- Epson compatible **$199**

Products for Macintosh

Hard Disks (External)

SCSI-MAC 20D	$649
SCSI-MAC 40D	$949
SCSI-MAC 91D 18ms	$1495

Tapes Backups
SCSI-MAC 60T **$950**

Modems
- Bell 103/212A • CCITT-22/BIS
- 300/1200/2400 Baud • On/Off speaker
- Super sleek look • Fully Hayes Compatible • Works with Smartcom, Apple Link, Mac Teminal.

SCSI-2400MD **$320**

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Conference continued from page 21

be able to interactively access full-motion video, audio, graphics and text from a standard CD-ROM or other digital medium.

The DVI Application System is created by adding authoring tools and video and audio digitizers to the Application Delivery System. DVI application developers will be able to utilize a low-cost application development environment based on the same vehicle as their target application system.

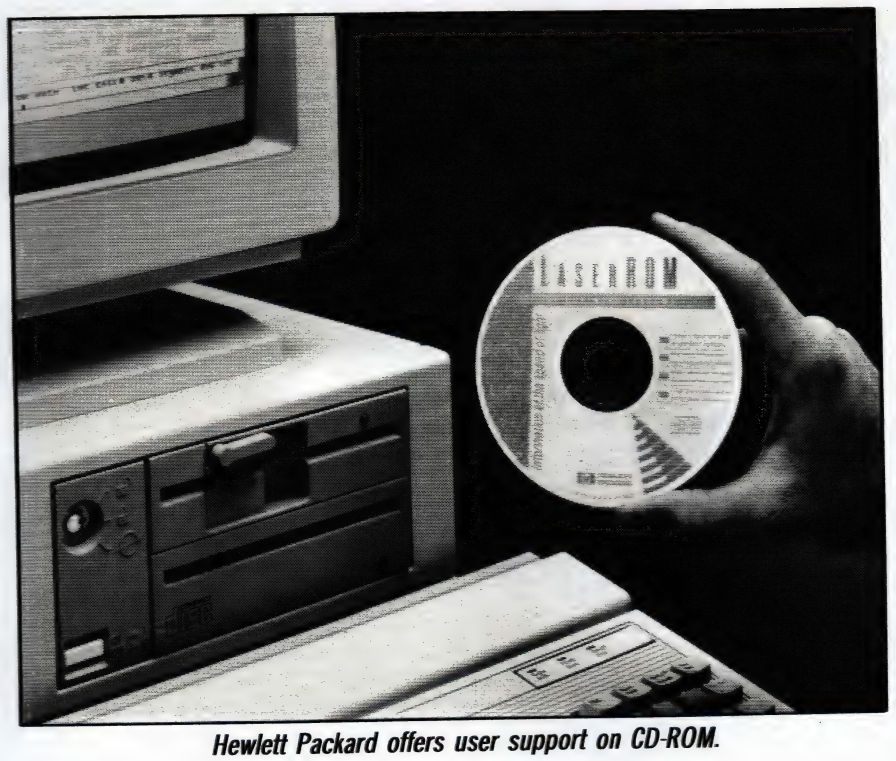
The GE DVI Technology Venture is currently developing a set of authoring tools to accompany the development system. The first authoring tools include edit-level motion video (ELV) compression, high-resolution still image compression, audio compression, graphics paint, standard "C" development tools, and a microcode assembler and debugger. These authoring tools will be delivered to the first group of development beta test sites during this month.

Microsoft Announces Two New CD-ROM Titles

Microsoft Corporation announced two new titles in its CD-ROM Reference Library series. One, Microsoft Small Business Consultant, is a comprehensive collection of publications on how to start and run a small business. The other, Microsoft Stat Pack, provides easy access to thousands of statistics compiled by the U.S. government. The two products join Microsoft's first CD-ROM product, Microsoft Bookshelf, a tool for power writers that provides electronic access to ten commonly-used reference works.

Both Microsoft Small Business Consultant and Microsoft Stat Pack provide users with quick and inexpensive access to materials that are often hard to obtain in print. They increase users' productivity by placing key information at their fingertips, saving hours of research time. Still more time is saved through the ability to copy information electronically into a word processor or spreadsheet, without having to rekey it.

"With the price of CD-ROM drives about half what it used to be and low-cost products such as Small Business Consultant and Stat Pack now available, a much broader range of users will be able to benefit from CD-ROM technology," said Tim Lopez, vice president of Microsoft's CD-ROM division. "Instead of spending hours researching through library stacks or paying thousands of dollars for online database searches, users can now have vast quantities of information available at their fingertips for less than $150 per disk."



Hewlett Packard offers user support on CD-ROM.

Because of CD-ROM's enormous storage capacity (over 600 MB per disk), random-access search capabilities, and low production costs, it is an ideal medium for publishing large quantities of information. The disks are accessed through a standard personal computer by adding a CD-ROM drive and Microsoft MSDOS CD-ROM Extensions.

Microsoft Small Business Consultant was created to help small-business owners obtain the information they need to start a business and keep it running successfully. By making this information available quickly and easily, Small Business Consultant helps business owners make timely decisions based on sound data. It saves them the time of performing extensive library searches for information that often is not readily available in either print or electronic form. It also saves them money: with a suggested retail price of $149, Microsoft Small Business Consultant costs less than half the price of the print versions of the publications it contains.

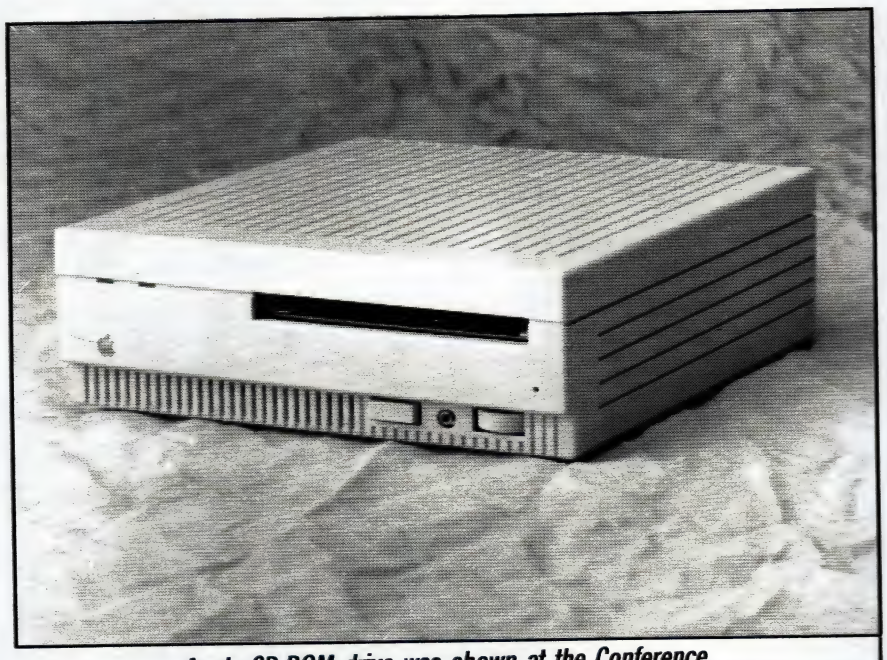
Over 220 government publications are included in Microsoft Small Business Consultant. In addition to materials published by the Small Business Administration, the disk includes publications from agencies such as the Department of Commerce, Veterans Administration, Defense Department, and General Services Administration. The disk also includes several publications from the accounting firm of Deloitte Haskins and Sells, with topics ranging from expanding a business overseas to a guide for foreign investment in the United States.

Designed to answer the questions most commonly asked by small business operators, Microsoft Small Business Consultant includes information on the following subjects: planning, starting, and developing a business; bank loans and other SBA programs; accounting and record-keeping; doing business with the government; advertising, marketing and selling; importing and exporting; liability and crime protection; general management and personnel management; and business information sources.

Because of the breadth of material it includes, the Small Business Consultant is helpful both for those starting a new business and for existing business owners who would like to advance their skills and improve the efficiency of their business. Others who can benefit from the information include accountants and other business consultants, bankers, government and lending agencies dealing with small businesses, and librarians.

To use the Small Business Consultant, the user simply enters key words on a topic of interest, such as franchise

continued on page 54



Apple CD-ROM drive was shown at the Conference.

CD-ROM continued from page 45

on the innovative spirit and drive of third party developers to help extend the technology and generate widespread acceptance. This conference is an important opportunity for sharing information, and we've all been deluged with it here. But more importantly, it's been an opportunity to share ideas. The people and companies who have come here from different industries and perspectives are people who already share one common idea. They are each personally motivated by the potentials of CD-ROM technology.

And it goes beyond recognizing a new business opportunity. We share a belief that the combined power of technology can be a positive force in the world. We share a passion for new solutions that will serve to unlock doors to information, not put up bigger ones. The computer is a simulation engine capable of encompassing all categories of tools previously created by man. It has the power to extend the reach of individuals by providing information and allowing them to apply their own insights to it. We at Apple are dedicated to the continuing refinement of our technology in human interface, networking, communications, and information. Working separately, we each have made an impact on communications in the Information Age. Now we need to look to each other to enhance our ability to share information and ideas.

We've each been a part of the crafting of the Information Age. Now we have the opportunity together to craft the future." ●

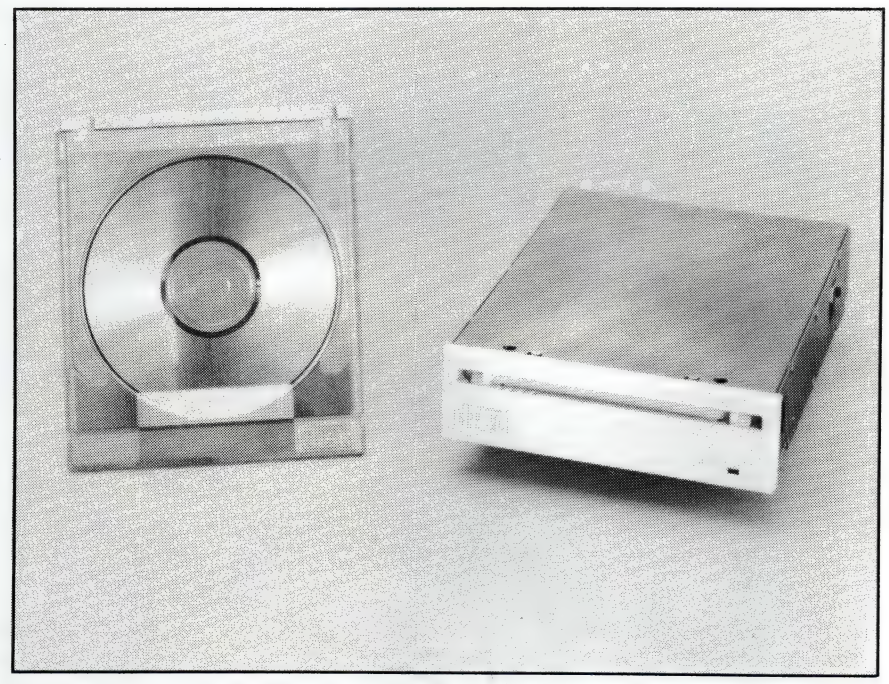
Some Facts Regarding Optical Storage

In 1985, 18 million American office workers each filed an average of 10 pieces of paper a day and needed four file cabinets to hold 12 months worth of documents. Four full file cabinets of text information would take up less than one-third of a single 12-inch high density disk.

A high-density optical disk contains between 10,000 and 20,000 tracks per inch compared to less than 50 for a standard magnetic floppy disk.

A high-density optical disk can hold the equivalent of 40 large reels of magnetic computer tape or up to 10,000 frames of microfilm.

There are three categories of optical storage media: 1) prerecorded media (CD-audio, CD-ROM, and video disks) where information is recorded on the disk at a factory. 2) Write-once media, where users record their own information on the disk and cannot alter or update that data. 3) Reversible or erasable media, where users record their own information on the disk and can alter or update data on the disk. This technology is now in its infancy. ●



Disk caddy makes half-height drives a reality.

Conference continued from page 53

licenses or inventory control. The search software then searches the disk for information relating to these topics and displays a list of the entries it finds. The user can choose to view any or all of the entries. Material can also be electronically pasted into a word processing document and then printed out to provide the user with a hard copy.

In addition to providing helpful business information, Microsoft Small Business Consultant includes templates created by the Small Business Administration for developing monthly cash flow and profit-and-loss projections. By simply loading these templates into a spreadsheet program and entering the required data, users can see a detailed analysis of their current business position.

Also included in the Small Business Consultant are a variety of job-analysis forms, checklists, and business-plan outlines that can be transferred directly to the user's word processor. In addition, the Small Business Administration's study guide materials are included to help users assimilate the wealth of information provided on the disk. The study guides ask questions about the material presented in the publications; users can press a key to see the correct answers.

Microsoft Stat Pack is a compilation of official U.S. government facts and figures on the economy, politics, demographics, manufacturing, industry, trade, agriculture, and business. By replacing volumes of reference material with a single CD-ROM disk, Stat Pack lets users find statistical information quickly and easily. It enhances user productivity by eliminating time-consuming library searches and long waits for publication availability. With a suggested retail of $125, it also is far more affordable than either online database searches or other CD-ROM products providing similar information—solutions that typically cost thousands of dollars.

Microsoft Stat Pack is helpful for anyone who needs quick and easy access to statistical data, including marketing researchers; strategic planners; librarians; information specialists in both the private and public sector (including local, state, and federal governments and agencies); journalists and writers; professors and students; farm cooperatives; and commodity and trade associations. It includes such documents as: Statistical Abstracts of the United States, a compendium of social, political, and economic statistics and one of the top-selling publications of the U.S. Government Printing Office; U.S. Business Statistics, covering statistics both on general business subjects (e.g., business indicators, employment, and earnings) and specific sectors (e.g., construction and real estate, transportation, and communication); and Agricultural Statistics, with statistics on agricultural production, supplies, consumption, facilities, costs, and returns.

As with Small Business Consultant, Stat Pack searches are performed simply by entering key search words on the topics of interest. Data obtained through these searches may be electronically pasted into a word processing document for further manipulation. Each table on the disk also has a corresponding spreadsheet file that can be loaded into a spreadsheet application for further manipulation.

Microsoft Small Business Consultant and Microsoft Stat Pack are compatible with popular word processing and spreadsheet software, allowing users to transfer data electronically from the disk to applications instead of having to rekey the information. Compatible word processors include Microsoft Word 2.0 and higher, IBM DisplayWrite III and IV, MultiMate I and II, PC-Write 4.71, PFS Write 1, VolksWriter 3, WordPerfect 4.2, and WordStar Professional 4.0. Compatible spreadsheet programs include Microsoft Excel 2.0 or higher, Microsoft Multiplan 3.0, Microsoft Works, and Lotus 1-2-3.

Microsoft Small Business Consultant and Microsoft Stat Pack have the same user interface as Microsoft Bookshelf—a character-based version of the popular Windows interface. With such user-prompting features as drop-down menus and dialog boxes, this interface makes it easy for even inexperienced users to learn the products quickly without extensive training.

Both products also come with complete documentation, including online help as well as an easy-to-use reference manual. The manual provides instruction on how to set up and start the application; conduct a search from within or outside a word processing environment; cut and paste data from the disk into a word processing document; access and retrieve tables and templates; and save time with shortcut keys and hot keys.

CD-ROM Drive Is New Entry From Sony

Huge online memory capacity is now available from Sony with its new CDU-7101 stand-alone CD-ROM drive designed for use with IBM PC XT/AT and compatible computer systems.

"We designed this system for the general business applications market," states Clem Shemanski, director of sales and marketing, Sony Computer Peripherals Division. "We believe that CD-ROM will emerge as a real market this coming year as the need for ultra-large storage, archival memory and large-scale quick-access reference storage increases."

The CDU-7101 comes with a PC interface (Sony bus), connecting cable, disk caddy and MSDOS CD-ROM Extensions disk. The system will access CD-ROM disks holding up to 540 Mb of data as well as conventional CDs for music.

Data transfer rate is 150 Kb per second on a sustained basis. The burst transfer rate is 600 Kb per second up to one block in length (2,048 bytes in Mode 1; 2,936 bytes in Mode 2). Access time averages 0.5 seconds.

The CD-ROM's optical pickup is automatically locked when the caddy is unloaded, and the unit's auto-loading mechanism assures easy and foolproof disk insertion. The caddy itself provides field-loadable media protection.

The new unit has three ways of ejecting the caddy: manually via a front-panel button, automatically via the host computer, and emergency ejection via the access hole.

Sony's LEC (Layered Error Correction) circuit is built into the drive and does not require attention from the host computer's CPU. Extensions to the Sony interface allow improved host computer control.

Up to four of the CD-ROM units can be daisy-chained through the Sony bus, and all units can provide the capability of output of CD-ROM audio tracks.

Laser Magnetics Introduces New Line Of Drives

Following the first volume shipments of its 5.25-inch half-height CD-ROM drives, Laser Magnetic Storage International Co. has introduced desktop configurations of these new products.

The CM 121 desktop unit succeeds the industry's best sold CD-ROM drive, the LMS CM 100. Over 20,000 units are now in use worldwide. Featuring front loading and an average access time of less than 500 milliseconds, the CM 121 provides virtually error-free access to up to 600 megabytes of prerecorded information on a removable compact disk. "Its MTBF (Mean Time Between Failure) is expected to exceed 16,000 hours, which will set new reliability standards in the CD-ROM industry," said Robert van Eijk, CD-ROM product sales manager at LMS. In addition to reading CD-ROM disks, the CM 121 desktop model will also play standard compact audio disks.

LMS's new CM 121 is plug-compatible with the CM 100, eliminating the need to modify existing application software. The CM 121 uses the same CM 153 host adapter for the IBM PC XT/AT, PS/2 Model 30 computers, and true compatibles. "Our new CM 121 offers improved performance, a smaller footprint, and increased reliability, without the need to change software or controllers," added van Eijk.

Quantity-one price for the CM 121 model is $820.

The new CM 131 offers the same performance features as the CM 121, but offers an industry standard SCSI interface. Through its SCSI interface, the CM 131 desktop model is the perfect product for the integration of CD-ROM with a larger variety of host systems. In addition, up to seven drives can be daisy-chained to one host, thereby offering online random access to up to 4.2 gigabytes of information. Quantity one price is $1130.

The CM 132 is the first dual drive subsystem in the CD-ROM industry. A desktop model consists of two CD-ROM drives in one cabinet and features an industry standard SCSI interface. The low-profile unit fits easily between the CPU and the monitor, saving valuable work space. Quantity one price is currently $1990. LMS plans to continue to support both the CM 100 and CM 110 CD-ROM drives.

HP Embraces CD-ROM As A Customer Support Tool

With the introduction of the Hewlett-Packard LaserROM service last September, HP became the first company to distribute customer support documentation on CD-ROM. This innovative service consists of preparing a CD-ROM with technical information (application notes, manuals, software status bulletins, etc.), sending the disk to the customer, and updating the disk on a monthly basis.

Equally important, HP LaserROM fits into Hewlett-Packard's overall customer support strategy. As the computer marketplace has evolved, support has become an increasingly important factor in the system purchase decision. This explains why HP emphasizes its customer support programs and continually explores new opportunities that could enhance this vital area.

Hewlett-Packard began seriously evaluating CD-ROM technology as a means to deliver customer support documentation in 1987. To understand the breadth of this evaluation, consider that HP devotes more than 1,000 people to developing, maintaining, and distributing support documentation. Further illustrating this point, HP provides 7,900 manuals containing more than one million pages to its customers.

The company thought that placing support documentation on CD-ROM

continued on page 73

Northgate's "C/T"—The New Keyboard Champion!

The Resounding Favorite of Critics, Corporations and People Like You Who Know and Demand the Best—For the Least!

NOW COMPATIBLE WITH ALL IBM PS MODELS

"Northgate's excellent tactile response approximates the 'clicky' feel that IBM keyboards are known for. Typing on the C/T is smoother and more comfortable than on any of the replacement or clone keyboards I've tried."

Jonathan Matzkin, *PC Magazine*

"I was surprised to discover how these keyboards increased my productivity. My ears can tell when my fingers have mistyped, and when I'm flying across the keys, my fingers get the kind of feedback they evidently need. As far as I'm concerned, C/T could also stand for Certainly Terrific."

Keith Ferrell, *COMPUTE!s PC*, March, 1988

Northgate "has something special to offer...In operation, the 101 C/T feels like a close cousin of the original IBM-PC...It is very crisp and firm...[J]udging from its bank-vault construction, it may very well outlast its users."

James Stovall, *PC Clones*, May, 1988

- 10-Day Money-Back Satisfaction Guaranteed!
- 3-Year Unlimited Warranty

$99.00

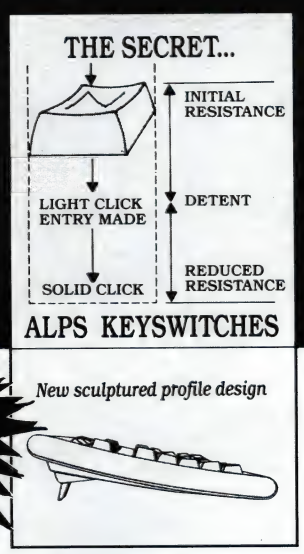
Enhanced 101-Key Model C/T 101

Separate cursor pad and numeric keypad; Enlarged L-shaped Enter Key, Double-Wide Backspace, Shift and CapsLock Keys; Lights for CapsLock, Numlock, ScrollLock. Full AT and XT Compatible. Heavy, metal base so keyboard won't slip around on desk.

$79.00

Standard 84-Key Model

This model features the function keys on the left as in the original IBM design. Has the same Click/Tactile feel as the 101-key model. Features L-Shaped Enter key, double-wide CapsLock and 3 LED Lights.



Here's Why The Experts Rave

Northgate is giving the world what it has always wanted—The touch, the sound, the feel of a selectric typewriter. No more of the mushy, spongy feel, the dull thunk that lets you know you have fingertips—but not that you have typed in a character. Finally you can get IBM-like keyboard feel at a sensational price.

Other companies give you keyboards with a rubber-like membrane below the keys. No click, no sound, no feel. But cheap to make. OURS AREN'T! Northgate uses Alps Keyswitches, the most expensive, highest quality switches available for keyboards! And Northgate quality assures you years of service.

Typists Love The Touch, Pros Love The Productivity

Plug the Northgate "C/T" into your system. Press a key. WOW! At first touch you know this is it. The key passes detent at center position with a slightly audible "click." Sound and change in tension tell your fingers you've made an entry. As the key bottoms, a more positive click confirms the entry and signals the finger to release and hit another key. Touch typists love it.

In actual typing tests, speed increased by up to 28 percent with a 16 to 20 percent reduction in errors. Besides making typing enjoyable again, the increases in production you get with the "C/T" should be enough reason to replace all your keyboards.

3-Year Unlimited Warranty

Some day all keyboards will use the same key-switches and quality components Northgate incorporates in its 84-key and 101-key keyboards. But for now, Northgate leads the way. Order yours today. If you are not 100% satisfied in every way, return it within 10 days for a full refund.

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A DIVISION OF ABL INCORPORATED

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_____ (Quantity) "C/T" 84 @ $79.00
_____ For IBM PS Models add $30.00

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Company _____
Address _____
City _____ State ____ Zip _____
Phone _____ Type of Computer _____
Visa/Mastercard No. ____/____/____/____
Expiration Date _____
Signature _____

Note: order processing takes 3-4 days. We ship UPS. For ground shipping add $7.00 ea. allowing 2-3 weeks for delivery. For second day after processing time add $12.00 ea. For overnight after processing time add $22.00 ea.

Compatible with most current model XT and AT type systems with standard 5-pin din connector. Some computers are not compatible with standard IBM connectors—these may include some models of Zenith, Tandy, and AT&T.

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Compare performance...compare cost...compare features...compare quality.
Nowhere in the world will you find a 386 system to compare with...

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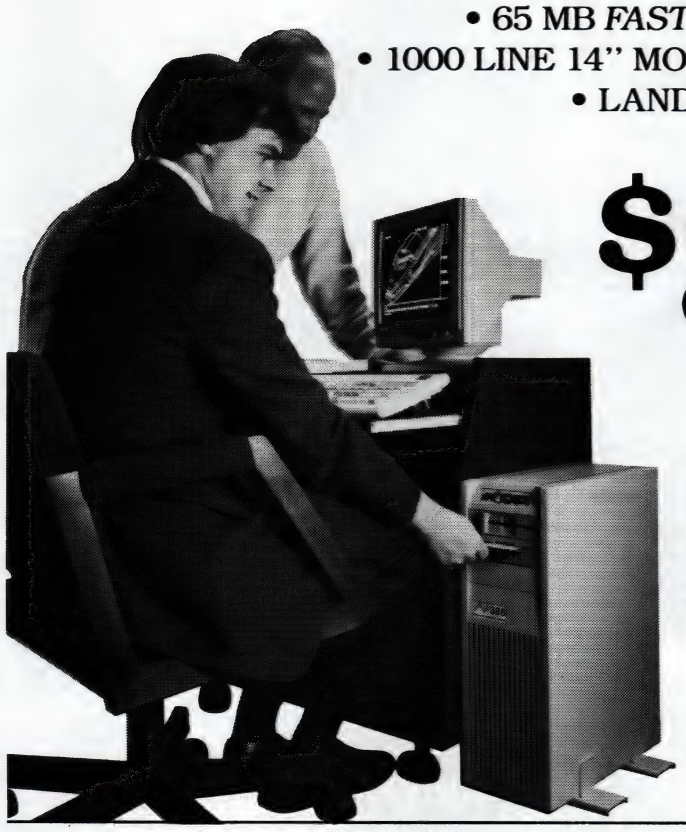
64 KB ZERO WAIT STATIC RAM CACHING • 1.2 AND 1.44 FLOPPY DRIVES • VERTICAL CASE
• 65 MB *FAST* HARD DRIVE • RLL ENCODING • 1:1 INTERLEAVING
• 1000 LINE 14" MONITOR • HARD AND FLOPPY DISK CACHING • AUTO OPTIMIZE
• LANDMARK 1.09 RATING: 23.2 • NORTON V4 SI: 18.7



$3658.50 complete system

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Yes, "386 Northgate Power" includes every feature you see here. No phony "bare bones" pricing. No hidden costs. Extras galore you won't get from other vendors. And a price hundreds lower than you'll pay elsewhere for the same features—if they're even offered!

TWO FLOPPY DRIVES—a 5¼" 1.2MB AND a 1.44 MB 3½" for total disk compatability with IBM and portables. HARD AND FLOPPY DRIVE CACHING for instant data read and write: a 65MB HARD DRIVE INCLUDED IN OUR LOW PRICE! Plus many more quality advantages!

We cut no corners to bring this Spectacular System to you. Every part is World Class. Each System Skillfully Engineered and Custom Constructed in our own Plymouth, MN facilities.

SYSTEM IS FULLY CONFIGURED, HARD DRIVES ARE FORMATTED, SOFTWARE LOADED, READY TO USE... "386 Northgate Power" is the Ideal System for High Speed CAD/CAM Workstations; Desktop Publishing; Ultra High Speed LAN File Servers; Intermediate Size (1-16 terminals) time sharing systems using XENIX/UNIX.

The Complete System arrives at your office fully configured, ready to plug-in and run. Hard drives are formatted, and partitioned. PLUS, you get "Insta-Cache" disk caching AND VOPT, Golden Bow's great disk optimizing *program all included in the amazing low price!*

Study the features and see why "386 Northgate Power" is the best value in state-of-the-art power computing, then...PHONE NORTHGATE TO PLACE YOUR ORDER. (Delivery times are subject to order demand levels.)

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386 Northgate Power System Price Complete $3658.50

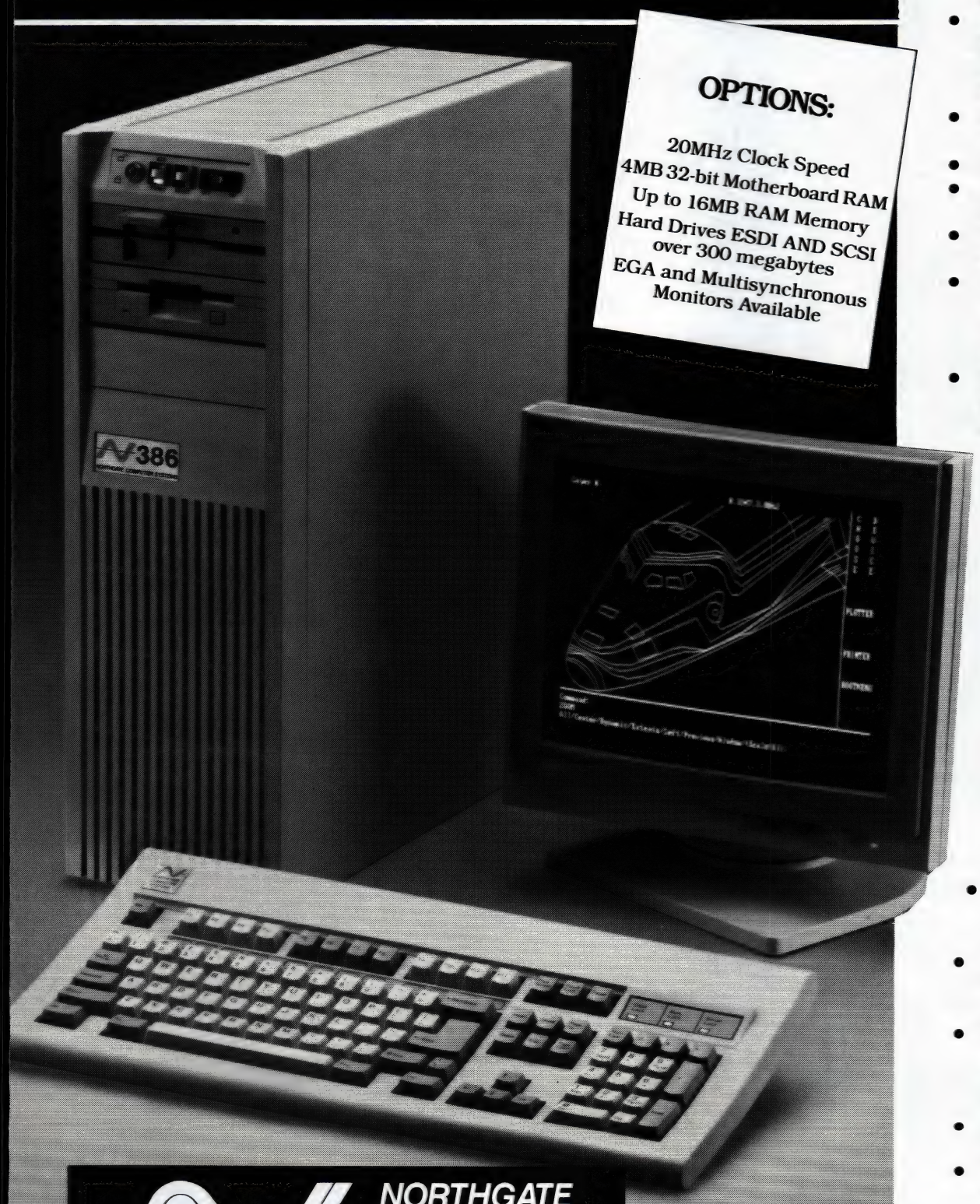
OPTIONS—ADD:	
20MHz INTEL DOUBLE SIGMA 80386 PROCESSOR	$949
3MB ADDITIONAL RAM INCL. EMS CARD (SUBJECT TO CURRENT MARKET CHIP PRICING)	CALL
HARD DRIVES ESDI AND SCSI TO 389MB (Un-Formatted)	CALL
EGA MONITOR W/640 X 480 AUTOSELECT CARD	$495
MULTISYNCHRONOUS MONITOR W/640 X 480 AUTOSELECT CARD	$695
MULTISYNCHRONOUS MONITOR W/800 X 600 AUTOSELECT CARD	$795
65 MEGABYTE HARD DRIVE FOR FAST BACKUP (INTERNAL)	$349
40 MEGABYTE STREAMING TAPE BACKUP (INTERNAL)	$495
60 MEGABYTE STREAMING TAPE BACKUP (INTERNAL)	$695
60 MEGABYTE STREAMING TAPE BACKUP (EXTERNAL)	$895
ON-SITE THIRD PARTY MAINTENANCE	CALL
EXTENDED WARRANTY AFTER ONE YEAR	CALL

TAKE THE NORTHGATE THRUPUT TEST.
Find out if your "zippy-fast" hard drive system is REALLY in the fast lane. Send us $5.00 cash, check or money order and we'll send you the THRUPUT test program. In seconds you'll know how your system compares to Northgate systems. And when you buy a Northgate system, we'll refund the $5.00!

NO PHONE REQUESTS PLEASE

The New Price/Performance Leader in State-of-the-art Power Computing!

Compare "386 Northgate Power" Feature-For-Feature, Dollar-For-Dollar With Any Other 386 On The Market:



OPTIONS:

20MHz Clock Speed
4MB 32-bit Motherboard RAM
Up to 16MB RAM Memory
Hard Drives ESDI AND SCSI over 300 megabytes
EGA and Multisynchronous Monitors Available

All These Features are Standard on "386 Northgate Power":

- 64KB OF 0 WAIT STATIC RAM CACHING IMPLEMENTED WITH 35/40 NANOSECOND STATIC RAM (Fastest Benchmark Tests of any 16MHz System)
- 8/16 MHz Cache/No-Cache, Keyboard Selectable
- BIOS with Setup and Diagnostics in ROM
- GENUINE DOUBLE SIGMA INTEL 386 PROCESSOR (Beware! Others may supply 16 MHz single Sigma Chips)
- 1 MEGABYTE OF 32-BIT DYNAMIC RAM ON BOARD. OPTIONAL 4MB ON MOTHERBOARD, 16 MB USING LOW COST RAM
- 6 AT-Compatible 16-bit slots; 2 XT-Compatible 8-bit slots
- Realtime Clock/Calendar
- 80287 or 80387 Co-Processor Capability
- ELEGANT, HEAVY-DUTY VERTICAL CASE (Not a PC Stood on End)
- TWO FLOPPIES—1.2MB 5.25 AND 1.44MB 3.5 (Others sell only a 1.2 MB and charge up to $200 for the 1.44MB Drive)
- 65 MB HARD DRIVE WITH DISK CACHING (For virtually zero-wait read/write access)
  - 14 INCH 1000 LINE FLAT SCREEN MONITOR (A $149.00 added value at no extra cost)
  - STD Herc. Graphics Card Supplied.
  - Our Own Insta-Cache program—up to 1.6MB of instant-access disk caching. Makes disk read/write access near zero-wait!
  - The superb Golden Bow Systems VOPT disk optimizer, another Northgate Exclusive. Super-fast disk organizing program keeps hard drives operating at "factory-new" performance!
- MS-DOS 3.3 (the most current version) with GWBASIC in bound covers.
- OUR EXCLUSIVE "C/T" 101 KEYBOARD Nationally advertised at $99.00.
- Fully Compatible with Novell, MS-DOS, Microsoft OS/2, Xenix, Unix AND VIRTUALLY ALL 286 SOFTWARE
- FULL YEAR LIMITED WARRANTY, PARTS AND LABOR
- DESIGNED AND BUILT IN AMERICA

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A DIVISION OF ABL INCORPORATED

13895 INDUSTRIAL PARK BOULEVARD, SUITE 110
PLYMOUTH, MINNESOTA 55441

Use Our Toll-Free Order Number

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Hours: M-F 8 a.m.-7 p.m. CST
Sat. 9 a.m.-3 p.m. CST

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PC MAGAZINE REPORTS..."PC Labs tested drive

AND NORTHGATE'S 80286

TAKE THE NORTHGATE THRUPUT TEST!

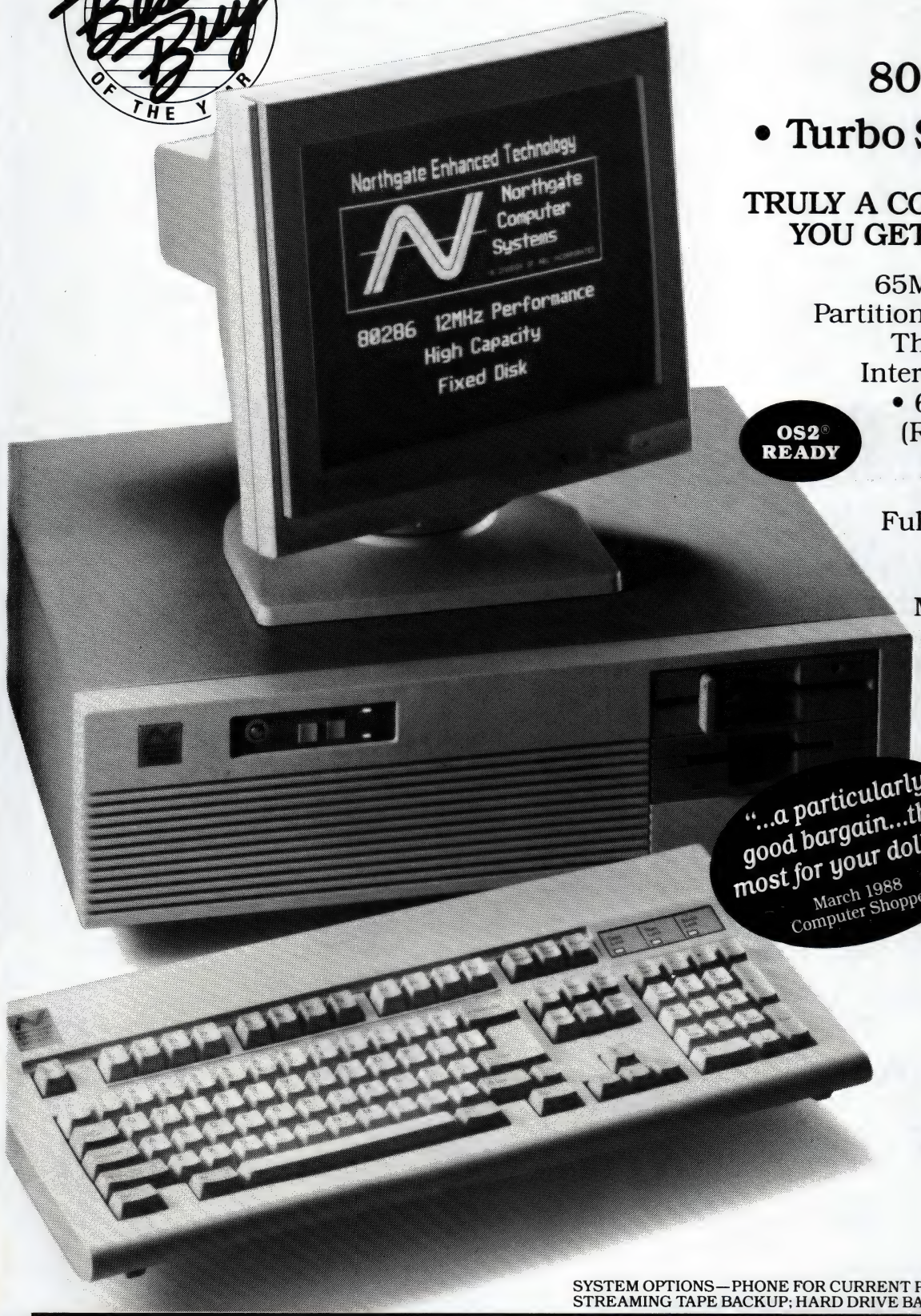
Find out if your "zippy-fast" hard drive system is REALLY in the fast lane. Send us $5.00 cash, check or money order and we'll send you the THRUPUT test program. In seconds you'll know how your system compares to Northgate systems. And when you buy a Northgate system, we'll refund the $5.00!

NO PHONE REQUESTS PLEASE

Now, with Northgate Super 286

Turbo Throughput™

COMPUTER SHOPPER '87 Best Buy OF THE YEAR



OS2® READY

"...a particularly good bargain...the most for your dollar."
March 1988
Computer Shopper

800,000 Bytes Per Second Data

• Turbo Speed Hard Drive Controllers

TRULY A COMPLETE, READY TO USE SYSTEM YOU GET ALL THESE QUALITY FEATURES:

65MB Miniscribe Hard Drive, Formatted and Partitioned 32.5MB in C and D Partitions • Turbo Throughput 16-Bit Hard Drive RLL and 1:1 Interleave Controller • 12MHz Intel Processor • 6 16-Bit, 2 8-Bit Expansion Slots • 1.2MB (Reads & Writes 360K Disks) AND 1.44MB Drive (Reads & Writes 720K) • 200 Watt Power Supply • 2 Parallel, 1 Serial Port • Full Size (Not Baby Size) Case with Keylock, Turbo On/Off, Indicator Lights • 14 Inch Tilt/Swivel Flat Screen Amber Graphics Monitor with 1000 Line Resolution Capability for CAD • Hercules Compatible Graphics Card • Latest Version MS-DOS 3.3 with GWBasic including hardbound manuals for both (Northgate is a Microsoft OEM Licensee).

AND NOW, TO GIVE YOU EVEN GREATER PERFORMANCE...

DRIVE CACHING AND VOPT™ OPTIMIZER ARE INCLUDED!

Installed on your hard drive is Northgate's exclusive Insta-Cache™ Hard Disk Caching program. Once a file is read it's in cache. Retrieving it again is 0-wait. No hard drive access is needed. This is an $80.00 value, yours at no extra cost. AND...WE ALSO GIVE YOU THE BEST DISK OPTIMIZER PROGRAM EVER—VOPT™ BY GOLDEN BOW SYSTEMS. CLEANS UP FRAGMENTED SECTORS AUTOMATICALLY EVERY TIME YOU START YOUR SYSTEM. A $50.00 VALUE, AGAIN YOURS FREE WITH THE NORTHGATE 286.

SYSTEM OPTIONS—PHONE FOR CURRENT PRICING: EGA, EGA+; MFM HARD DRIVES, ESDI & SCSI TO 300MB; STREAMING TAPE BACKUP; HARD DRIVE BACKUP FROM $389; MEMORY EXPANSION CARDS; CO-PROCESSORS.

400% Faster Performing WORLD CLASS QUALITY Features Unmatched Anywhere

The Bottom Line

$2199.00 complete as shown

throughput on all the (21) machines in this review, (Feb. 16, 1988)
WAS THE FASTEST...

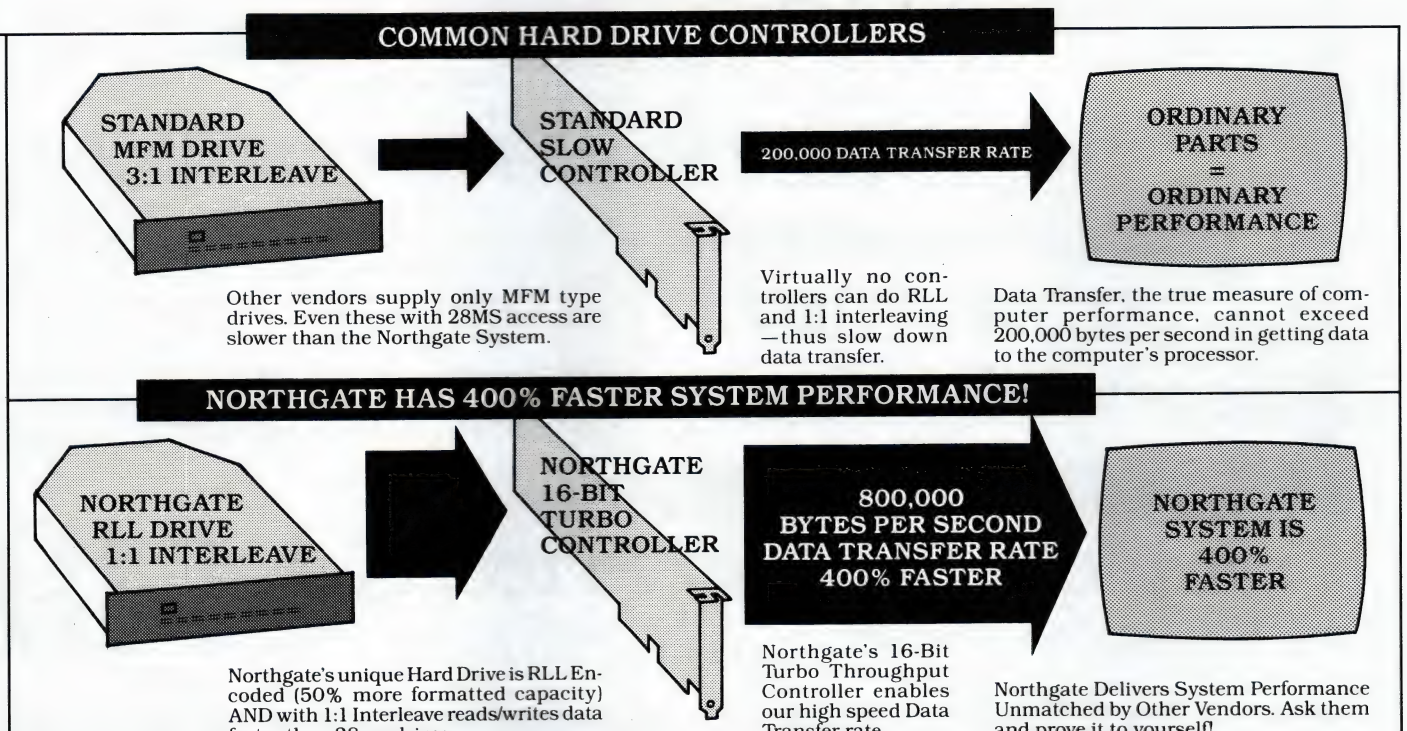
65MB Hard Drive System you get:

Computing Power

Transfer Rate • RLL Encoded Hard Drives • 1:1 Interleaving • World's Highest Performance AT Class Computer System!

HERE'S THE SECRET OF TURBO THROUGHPUT

THE ADVANCED DESIGN THAT MAKES THIS SYSTEM PERFORM 400% FASTER THAN OTHER AT TYPE COMPUTERS AS THEY ARE COMMONLY CONFIGURED AND SOLD BY MOST VENDORS IN THE PC INDUSTRY!


COMMON HARD DRIVE CONTROLLERS
STANDARD MFM DRIVE 3:1 INTERLEAVE
STANDARD SLOW CONTROLLER
200,000 DATA TRANSFER RATE
ORDINARY PARTS = ORDINARY PERFORMANCE
Other vendors supply only MFM type drives. Even these with 28MS access are slower than the Northgate System.
Virtually no controllers can do RLL and 1:1 interleaving—thus slow down data transfer.
Data Transfer, the true measure of computer performance, cannot exceed 200,000 bytes per second in getting data to the computer's processor.
NORTHGATE HAS 400% FASTER SYSTEM PERFORMANCE!
NORTHGATE RLL DRIVE 1:1 INTERLEAVE
NORTHGATE 16-BIT TURBO CONTROLLER
800,000 BYTES PER SECOND DATA TRANSFER RATE 400% FASTER
NORTHGATE SYSTEM IS 400% FASTER
Northgate's unique Hard Drive is RLL Encoded (50% more formatted capacity) AND with 1:1 Interleave reads/writes data faster than 28ms drives.
Northgate's 16-Bit Turbo Throughput Controller enables our high speed Data Transfer rate.
Northgate Delivers System Performance Unmatched by Other Vendors. Ask them and prove it to yourself!

Most computers look similar. Most vendors advertise processor speed and 28MS hard drive access. There is little to distinguish one from another. Thus everyone tends to assume all computers are alike.

NOT SO. Northgate is truly a different System. And because it is, the computer buyer gets far greater computer value for his money. That's why Northgate has soared in popularity. Those who know choose Northgate.

They know they get value through performance that's demonstrated every time they turn on the system. They know all parts are World Class, not the ordinary "off the shelf" items others use to keep costs down.

Northgate pioneered RLL Hard Drive and 1:1 Interleaving in its 286 systems. To our knowledge, no competitor even offers these vital performance features. Call them. We did. Only Northgate gives you this unique throughput-enhancement.

If Northgate pricing seems higher, don't be deceived by Bare Bones Prices you see in others' ads. Northgate's System is complete—IT'S THE 286 SYSTEM YOU WON'T OUTGROW! We encourage you—Shop Around, Call all the Others and Compare.

ALL THIS PLUS...The Computer Industry's Most Meaningful Service and Warranty Policy...

30-Day Compatibility Warranty:
Northgate guarantees its systems will operate any standard, commercialy available DOS programs written for use on IBM Compatible Computers. If, on consultation with Northgate, a program cannot be made to operate satisfactorily, owner may return the system, complete and unaltered for a prompt and full refund including all freight costs.

One-Year Overnight AT NORTHGATE EXPENSE Parts Replacement Warranty:
Northgate Computer Systems warrants that all systems sold by Northgate will be free of defects in workmanship and materials for one year from date of shipment.

- In the event of failure of a part that disables the system Northgate will ship, the same day if notified by 12 Noon Central Time, a new replacement part. Customer must phone Northgate Customer Service for diagnosis of the failure.
- Shipment of the replacement part will be by overnight-express service—AT NORTHGATE'S EXPENSE—for next day delivery depending on the carrier's ability to provide such service in owner's geographic area.
- Owner must return any replaced part, complete and unaltered, and pay return shipping costs, to be received at Northgate within two weeks after receiving the replacement part.
- Northgate's Customer Service department will provide full instructions on making the repair or replacement and will consult with customer on the phone to assure repair is properly completed and the system is again operating.
- In the case of a complete system returned for repair under warranty, customer pays freight to Northgate and Northgate pays return freight by whatever service the system is sent to Northgate.

In the event of a part replaced under warranty, the new part carries a NEW ONE-YEAR GUARANTEE FROM SHIP DATE!
NOTE: Many computer vendors extend only the parts manufacturer's warranty which may be as little as 30-days.
All products sold by NORTHGATE are fully guaranteed by Northgate for one year from date of shipment.

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A DIVISION OF ABL INCORPORATED

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PLYMOUTH, MINNESOTA 55441
HOURS: Mon.-Fri. 8A.M.-7P.M. CST, Sat. 9A.M.-3P.M.

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VISA MC COD TERMS: Credit Card, Pre-Payment (allow 2 weeks for personal checks to clear) Wire Transfer and Purchase Orders for Rated Accounts. We also ship to APO and FPO. All shipments are FOB Minneapolis, MN

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Northgate's V20/8MHz XTurbo Is Now Available with 60MB Hard Drive and the same "Enhanced Technology"

NOW...for the buyer who doesn't need 286 speed but wants an XT type system with through-put up to four times faster than other systems, Northgate offers its XTurbo/V20/8-65.

This system also features the MiniScribe hard drive and high speed controller. It is furnished complete with:

V20 Microprocessor • 640K Memory on Motherboard • 360K Floppy Drive • MiniScribe 60MB FAST Hard Drive with 1:1 interleave • 8 Expansion Slots • 2 Parallel, 1 Serial Port, Clock-Calendar, Game Port • Amber Screen TTL Graphic Monitor with Hercules Compatible Video Card • Northgate "C/T" Click-Tactile 84-key AT style keyboard • Case is the AT style with turbo button, keylock reset button and indicator lights. *(Second Floppy Drive pictured is optional at additional cost.)*

Complete System Price: $1449.00

Same system with 30MB Hard Drive $1299.00

NORTHGATE GIVES YOU *THE MOST POWERFUL CONSUMER PROTECTION WARRANTY* IN THE COMPUTER INDUSTRY...

30-Day Compatibility Warranty:

Northgate guarantees its systems will operate any standard, commercially available DOS programs written for use on IBM Compatible Computers. If, on consultation with Northgate, a program cannot be made to operate satisfactorily, owner may return the system, complete and unaltered for a prompt and full refund including all freight costs.

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TERMS: Northgate accepts VISA and MASTERCARD charge cards with no surcharge. Purchase orders from established accounts, also accepted as well as COD (Cashiers Check) and Wire Transfer. Personal and Company Checks require 18 days to clear. APO and foreign orders accepted. All shipments are FOB Plymouth, MN. Delivery is subject to time required for order processing, manufacturing and 24 hour testing.

CONSUMER PROTECTION TIP TO PROSPECTIVE COMPUTER BUYERS:

When shopping, remember the Better Business Bureau Motto: "If it sounds too good to be true, it probably is." Exceedingly low prices are your first warning.

Most computer direct sales firms are trustworthy. BUT, better to be safe than sorry.

BEFORE YOU PLACE YOUR ORDER, PHONE THE BETTER BUSINESS BUREAU OFFICE IN THE VENDOR'S AREA. (Your local BBB will give you the phone number for the appropriate office.)

Use our Toll-Free Order Number

800-548-1993

Hours: M-F
8 a.m.–7 p.m.
Central.
Sat. 9-3

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PRICE SUBJECT TO CHANGE WITHOUT NOTICE.

COMPLETE 12 MHz ZERO-WAIT 286 SYSTEM

WITH 32 MB HARD DRIVE!

Can you believe it? *Yes you can!*

32 MB hard drive. 12 MHz ZERO Wait State. Fully AT compatible. Our *complete* '286 system ready to plug in and fly right out of the box! At the amazing price of only $1,295!

How is it possible? By buying direct from the manufacturer that's how. ZEOS International offers you the finest, best-backed fully AT compatible systems available . . . at *factory direct* prices.

We think you'll agree, this is the very best value you'll find anywhere.

And every ZEOS® system is fully assembled, burned-in and tested in our own laboratories. We would like to build one for you. Give us a call today!

OTHER ZEOS OPTIONS:

- Basic System Only: Everything except HDD/HDC. $995
- Complete *64 MB* hard drive system! Only $1,595
- EGA Upgrade. 14" EGA color monitor with ZEOS EGA card. Fully tested. Add $495
- Many other drives and options available. Call Toll Free for details, 800-423-5891.

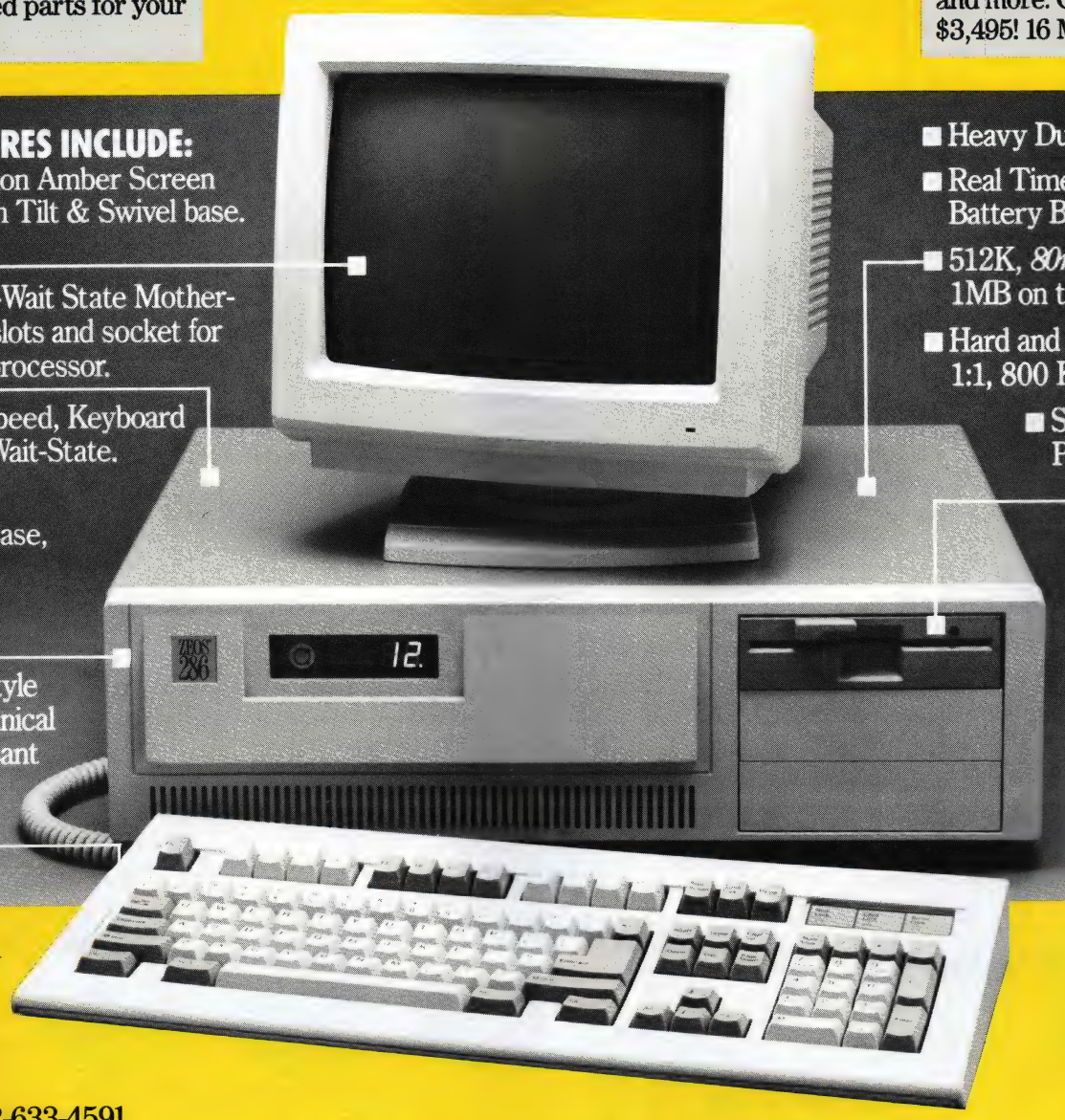
ZEOS® Customer Assurance Program

Compare not only our features but the ZEOS® Customer Assurance Program as well: 1. Full refund within 30 days of shipment if you are not absolutely satisfied. 2. One full year limited warranty on parts and labor. 3. Federal Express replacement of any failed parts for your first year of ownership.

ONLY $1,295.00

NEW! ZEOS® '386 Tower System

Available now! ZEOS® 386 Tower System! Complete with 64 MB HDD; Adaptec 2372 HDC, 1:1 interleave, 800 KB/sec transfer rate; 1 MB RAM, Zero-Wait, cache memory, 1.2 FDD, High Resolution tilt swivel monitor, 101 key keyboard, and more. Complete 20 MHz System $3,495! 16 MHz $2,995!



STANDARD FEATURES INCLUDE:

- 12" High Resolution Amber Screen TTL Monitor with Tilt & Swivel base. Easy on the eyes!
- 80286 CPU Zero-Wait State Motherboard with 8 I/O slots and socket for 80287 Math Co-processor.
- 6/12 MHz Dual Speed, Keyboard Selectable, Zero Wait-State. Phoenix BIOS!
- Deluxe AT-style Case, Security Keylock, Reset Button, LEDs.
- Full 101 key AT-style Keyboard, Mechanical Tactile with Pleasant "Click" Feel.
- Heavy Duty 200W Power Supply.
- Real Time Clock/Calendar with Battery Backup.
- 512K, *80ns* Memory expandable to 1MB on the Motherboard.
- Hard and Floppy Drive Controller; 1:1, 800 KB/sec!
- Serial and Parallel/Printer Ports.
- 1.2 MB High Capacity Floppy Drive.
- 32MB hard drive.
- High Resolution Monochrome Graphic Card.
- FCC approved.
- Norton SI: 15.3.

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Due to currency fluctuations and other factors beyond our control, prices are subject to change without notice.

Call for complete warranty details.

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St. Paul, MN 55112

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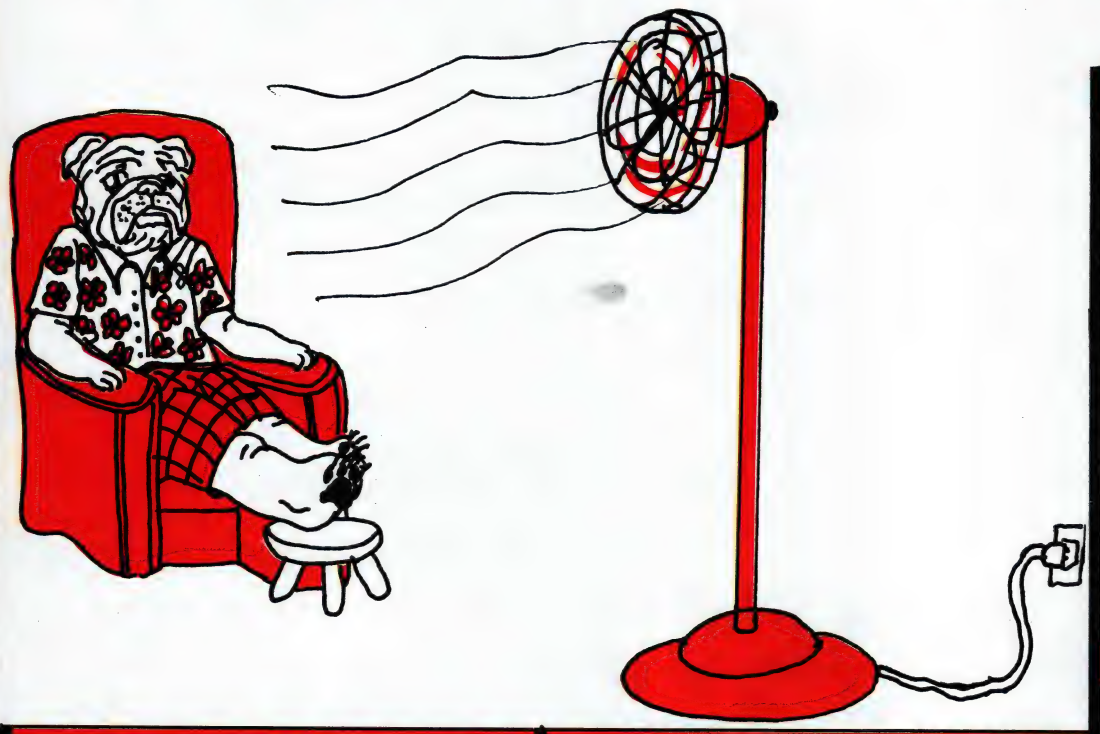

IBM

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Model 30 w/2 floppy	$1250
Model 30 w/1 floppy & 20 mg	1725
Model 50	2695
Model 60 - 40/70	3425/3650
Model 80 - 40/70	4450/4975

90 day warranty through Bulldog

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386 Desk Pro 40/60/130	$4599/5575/6950
286 Desk Pro 12 mhz	1795
Compaq II Model IV	2879
Compaq Port. 386 model 40/100	5999/7399
Compaq III 20mb/40mb	3695/4195
VGA Monitor	549
VGA Card	469

90 day warranty through Bulldog

MATH COPROCESSORS

803-87-20	750
80387-16	475
80287-8	249
80287-10	299
8087-3	119
8087-2	149

COMPATIBLE

TURBO XT

8 mhz, 1 floppy, 640K, AT style keyboard, monographics card, mono monitor $750
Color System add **$150**
w/20 mb add **$279**, w/30 mb add **$299**
90 day warranty thru Bulldog

Club AT

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Club 386 - 16 mhz, 1 mb Ram, 1.2 floppy $1850

Wyse AT Systems

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12 mhz - 0 wait state, 1.2 floppy, 1 m.b. Ram, serial/parallel port, clock calendar, DOS 1895
Wyse 386 system, 1.2 floppy, 1 m.b. Ram, serial/parallel port, clock calendar, DOS 2595

All Wyse systems carry a 1 year manufacturers warranty — parts and labor.

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NEC Multispeed	$1410
NEC Multispeed EL	1625
NEC Multispeed HD	2299
Toshiba 1000	810
Toshiba 1200	2395
Toshiba T1100 Plus	1450
Toshiba 3100	3169
T 3200	3895
T 5100	4995

GRAPHICS CARDS

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EVEREX MICRO ENHANCER	135
EVEREX THE EDGE	189
GENOA SUPER HI RES	179
HERCULES GRAPHICS	181
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PARADISE Auto Switch 480	159
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SIGMA COLOR 400	299
NEC GB-1 Multisync	199
NEC MVA	795
STB Chauffeur HT	135
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VEGA DELUXE	189
VEGA VGA	265

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AST Advantage w/128K	$239
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AST 6 PACK PREMIUM w/256K	199
AST 5251-11 PLUS Enhanced	625
AST RAMPAGE 286	375
AST HOTSHOT	355
EVEREX MAGIC CARD II w/384K	215
EVEREX MINI MAGIC w/o K	59
FAST 88/V20 w/Switch	89
INTEL Above Board 286 w/512K	319
INTEL Above Board PS286 w/512K	349
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J RAM III for AT w/o K	229
J LASER PLUS PC/AT	489/589
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ORCHID TINY TURBO 286	269
ORCHID RAMQUEST 50/60 w/2mb	659
ORCHID TWIN TURBO	389

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MOUSESYSTEMS MOUSE	89
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LOGITECH HI RES	99
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Policy: Add 3% (minimum $10) shipping and handling. Larger shipments may require additional charges. Personal and company checks require 2 weeks to clear. For faster delivery use your credit card or send cashier's check or bank money order. Georgia residents add sales tax. All prices are USA prices and are subject to change and all items are subject to availability. Defective software will be replaced with the same item only. Hardware will be replaced or repaired at our descretion within the terms and limits of the manufacturer's warranty. We cannot guarantee compatibility. All sales are final and returned shipments are subject to a restocking fee. All returns must be assigned an RMA number for return authorization. Call (404) 860-6899.

...and BULLDOG is COOLING OFF PRICES!

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LQ 850 330 CPS, 88 NLQ	479
LQ 1050 330 CPS, 88 NLQ	659
LQ 2500 324 CPS, 108 NLQ	829
EX 800 300 CPS, 60 NLQ	399
EX 1000 300 CPS, 60 NLQ	469

OKIDATA

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292 Plus 240 CPS, 100 NLQ	439
293 Plus 240 CPS, 100 NLQ	575
294 Plus 400 CPS, 100 NLQ	809
393 450 CPS, 120 LQ	925
Laser Line 6	1450

TOSHIBA

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351 SX 350 CPS, 100 NLQ	950
341SL 216 CPS, 72 NLQ	615

NEC

2200	359
P6/P7	435/619
P5XL/P9XL	850/1030
3550/8850	725/1020

PANASONIC

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1091 Model II	199
1092	309
1592	405
1595	469

HEWLETT-PACKARD

Laser Series II	1695

DICONIX 150	325
OTC 850 850 CPS	1775

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Seagate 20mb w/contr. ST225	279
Seagate 30mb w/contr. ST238	309
Seagate 30 mb for AT ST4038	489
Seagate 40 mb for AT ST251	399
Micropolis 70 mb	695
IOMEGA BERNOULLI	
10 mb w/card	1039
10 + 10 w/card	1550
20 + 20 w/card	1925
BERNOULLI PLUS	3450
BERNOULLI BOX II 5¼"	
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20 mb external w/card	1195
dual 20 mb external w/card	1795
SYSGEN Durapack single	925
dual external/internal	1695/1395
Plus Hard Card 40	709
Plus Hard Card 20	525
Priam 60 mb AT	819
Priam 43 mb AT	685

MODEMS

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Everex 2400 int./ext.	179/249
Hayes 1200/2400	279/419
Migent Pocket Modem	125
US Robotics 2400 direct internal	169
Ventel Half Card 1200 w/Crosstalk	259
Vental Half Card 2400 w/Crosstalk	359
Ventel 1200 Plus	239
Ventel 2400 Plus	359

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AMDEK

410	$145
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PRINCETON

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HX12	419
HX12E	449
HX9	415
Ultrasync	529

IBM

Mono 8503	199
Color Display 8512	449
Color Display 8513	515
Color 8514	1150
Magnavox RGB80	259

NEC

NEC Multisync II	589
NEC Multisync Plus	879
NEC Multisync GS	199
NEC Multisync XL 19"	2075

SOFTWARE

Aldus Pagemaker	$459
Chartmaster	209
Clipper	379
Corefast	99
Crosstalk XVI	99
D Base III	379
DBXL	129
Enable 2.0 w/Perspective	379
Fastback Plus	115
Foxbase +	199
Freelance Plus	329
Framework II	389
IBM Display Write IV	289
Lotus	309
Lotus Hal	49
Managing Your Money 4.0	125
Microsoft Word 4.0	229
Microsoft Excel	329
Microsoft Works	129
Multimate Advantage II	269
Multiplan	119
Office Publisher	589
Office Writer 5.0	259
Peachtree II Complete	149
PFS Prof Write	119
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Symphony 1.2	439
Ventura Desktop Publishing	499
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Wordstar 2000 + 3.0	239
Wordstar Pro 4.0	209

TAPE DRIVES

Everex 60 m.b. internal	$550
external	635
Genoa Galaxy 60 mb internal	799
external	929
Archives 40 mb internal	339
Sysgen Quic 60 internal	895
external	949
Sysgen 20 mb internal	575
external	650

Prices Subject To Change

For Orders Call: **1-800-438-6039**

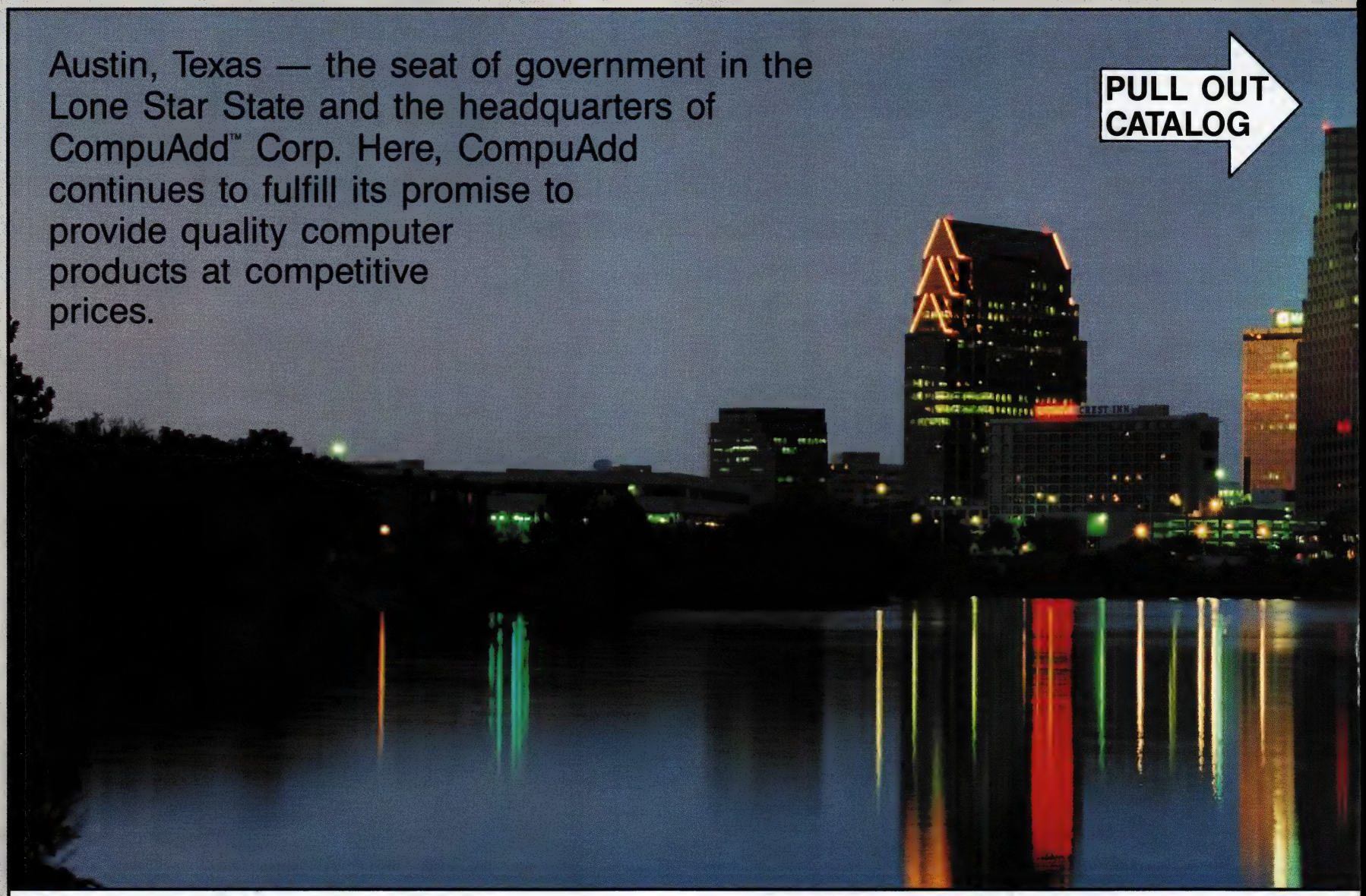
BULLDOG

COMPUTER PRODUCTS

For shipping & technical call: **(404) 860-6905** or **(404) 860-7364**

Austin, Texas — the seat of government in the Lone Star State and the headquarters of CompuAdd™ Corp. Here, CompuAdd continues to fulfill its promise to provide quality computer products at competitive prices.

PULL OUT CATALOG



San Antonio, Texas now has two CompuAdd Superstores. Our regular retail outlet and outside sales team in the McCarty store provide prompt, personal service to San Antonio businesses.

The 100,000-square-foot corporate headquarters in northwest Austin houses the manufacturing and assembly groups, administrative offices, and an international division, which serves customers in Europe, South America, Mexico, and Canada.

CompuAdd was established in March 1982 as a direct-response company specializing in add-on products for the growing personal computer industry.

Today, CompuAdd's own products — Standard Brand™ computers and peripherals — are nationally recognized for their reasonable prices and dependable performance. *PC Magazine*, a leading industry periodical, bestowed Editor's Choice awards on CompuAdd's Standard-286/8™ and Standard-286/10™ personal computers and its FlashCard™ hard disk cards.

CompuAdd — the third fastest-growing private company in America, according to *Inc.* magazine, December, 1987.

CompuAdd

"Personal Computer Products"

$2

Summer Special!
8-piece Tool Kit for basic computer maintenance.
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Durable Disk File Box with lock for 100 diskettes.
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Your Window Into Savings!

CompuAdd
"Personal Computer Products"

Special Edition Summer 1988

TO OUR CUSTOMERS:

Welcome to CompuAdd's Summer Catalog Special Edition -- This catalog is your window into CompuAdd's world of computers, computer accessories, and office supplies. It's our largest catalog yet, incorporating a wide variety of exciting office products along with our nationally recognized line of personal computers.

Looking for savings? -- Turn to any page. You'll notice that we consistently offer our products at lower prices. These savings, combined with our superior service, assure you of the best value around.

Leaf through our catalog -- While we continue to offer the best in personal computer products, you can now turn to CompuAdd for low-cost, high-quality fax machines, personal copiers, business and scientific calculators, microcassette recorders, business phones, and answering machines.

Need some help? -- Confused about how a product works? Unsure if it's appropriate for your application? Call our toll-free sales number and a sales representative will help you out. Don't see what you need in the catalog? Call and ask -- we just might have it!

Use our quarter! -- Toll-free lines are available for your ordering convenience. Our coast-to-coast hours are 8 a.m. - 9 p.m. CST Monday through Friday and 9 a.m. - 5 p.m. CST on Saturday.

Relax -- *We guarantee your satisfaction.* You can return any hardware product within 30 days of purchase for a full refund of the purchase price. If you should have any questions about your purchase, you can call our toll-free customer service line: 1-800-999-9901.

So take a look -- We're sure you'll see something you want!

Thank you for your order!

THE COMPUADD TEAM

P.S. Don't miss our new, expanded hard drive section on pages 8-9 and our new office products section on pages 28-32.

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STANDARD- 286/10™ SYSTEM

PC MAGAZINE
Editor's Choice
Feb. 16, 1988

"Overall, the Standard-286/10 appears to be one of the most attractive values.... It comes with a good complement of manuals and software and performs precisely as you would expect. You should be happy with this one."

Alfred Poor
PC Magazine

QUALITY ASSURED

Our most popular 80286-based computer, the Standard-286/10, has received fantastic reviews from customers and critics alike. They rave about the system's solid performance, flawless compatibility, consistent quality, and remarkable low price.

The Standard-286/10 also receives constant applause for its conscientious design, thorough documentation, and outstanding customer service. All this, plus its many standard features, will make the Standard-286/10 popular with you, as well!

Featuring:

- 6 and 10MHz switchable speeds
- 80286 processor
- 512KB RAM expandable to 1MB
- 9.4 on Norton's SI Benchmark 4.0 test
- 1.2MB floppy drive
- Dual floppy/hard drive controller
- Six 16-bit expansion slots
- Two 8-bit expansion slots
- 200-watt power supply
- Math coprocessor socket
- Internal clock/calendar with battery backup
- Choice of AT-style, 5151, or enhanced 101-key keyboard

63150 *$1145*

Other Standard-286 systems are also available. *Turn to page 6.*

63150
Monitor is optional.

START OFF RIGHT...

The perfect starter system for the student, a new business, or the home.

Career Starter Kit™

FEATURING:

The Standard Turbo/10™, PC/XT® -compatible computer with:

- 4.77MHz and 10MHz switchable speeds.
- 8088 processor
- 640KB RAM
- 360KB half-height floppy drive
- Floppy drive controller
- 150-watt power supply
- Hardware reset circuit
- Choice of AT-style, 5151, or enhanced 101-key keyboard

Monitor - a high-resolution amber monochrome monitor with 12" display screen and monochrome graphics card with parallel port.

Printer - Star Micronics NX-1000™ provides software compatibility, plus 120cps draft and 30cps near letter quality printing, multiple type styles, nine-pin print head, Epson LX-800 and IBM ProPrinter II® emulation, dot-graphics capability, and tractor/friction paper feed.

Software - You'll appreciate **Professional Zen™**, a totally integrated software package that includes ZenWord™, ZenCalc™, and ZenLink™. **ZenWord** supports multiple type styles and more than 50 printer types. It features mail merge and spelling checker. **ZenCalc** provides 45 statistical functions. **ZenLink** supports XMODEM and XON/XOFF protocols. You can cut and paste between all Zen modules. The MS-DOS® operating system and GW BASIC® programming language complete your system.

Accessories - We've even added 200 sheets of continuous form paper, a printer cable, and ten blank floppies to get you started.

63717..... **$929**

Career Starter Kit with EGA

Career Starter Kit with industry standard 14" tube size EGA monitor (13" diagonal), EGA card, and I/O card with serial and parallel port.

63718..... **$1329**

...WITH A STARTER KIT!

This kit gives your business computing power in a hurry.

Professional Starter Kit™

FEATURING:

The Standard-286/10™, AT®-compatible computer with:

- 6MHz and 10MHz keyboard-selectable speeds
- 80286 processor
- 512KB RAM (expandable to 1MB on motherboard)
- 1.2MB floppy drive
- Dual floppy/ hard drive controller
- Eight expansion slots
- 200-watt power supply
- Clock/calendar with battery backup
- Choice of AT-style, 5151, or enhanced 101-key keyboard

Monitor - A high-resolution amber monochrome monitor with 12" display screen and monochrome graphics card with parallel port.

Printer - Epson LX-800 provides software compatibility, plus draft (150-180cps) and near letter quality printing, multiple type styles, Epson Character Graphics set, dot-graphics capability, and tractor/friction paper feed.

Hard Drive - An internal 20MB, half-height hard drive with an access time of 65ms.

Software - You'll appreciate **Professional Zen**, a totally integrated software package that includes ZenWord, ZenCalc, and ZenLink. **ZenWord** supports multiple type styles and more than 50 printer types. It features mail merge and spelling checker. **ZenCalc** provides 45 statistical functions. **ZenLink** supports XMODEM and XON/XOFF protocols. You can cut and paste between all Zen modules. The MS-DOS operating system and GW BASIC programming language complete your system.

Accessories - We've even added 200 sheets of continuous form paper, a printer cable, and ten blank floppies to get you started.

63725..... **$1545**

Professional Starter Kit with EGA

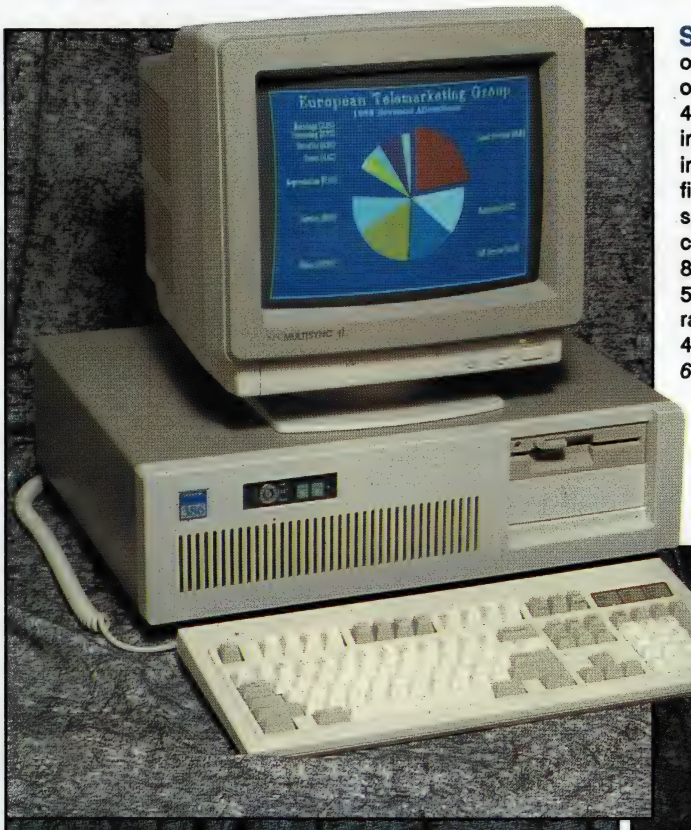
Professional Starter Kit with industry standard 14" tube size EGA monitor (13" diagonal), EGA card, and I/O card with serial and parallel ports.

63726..... **$1945**

STANDARD BRAND™

AT® -COMPATIBLE COMPUTERS

The logical choice for superior speed and satisfaction.



63250

Standard-386/16™ runs at software-selectable speeds of 16, 8, 6, and 4.77MHz. The system comes with 1MB RAM on a 32-bit high-speed memory board that is expandable to 4MB (supports up to 10MB RAM on expansion cards). For increased system throughput, the BIOS can be relocated into high speed RAM. System includes 1.2MB floppy drive, five 16-bit and two 8-bit expansion slots, a 200-watt power supply, dual diskette/fixed drive controller, real-time clock/calendar, coprocessor support for either the 80287 or the 80387, and your choice of enhanced 101-key, AT-style, or 5151 keyboard. The Standard-386 has a Landmark speed rating of 20MHz and scores 17.6 on Norton's SI Benchmark 4.0 test. Monitor is optional.
63250 $2095

63105

"... Its performance, features, and price are enough to make me want to take it home."

Vincent Puglia
PC Magazine

PC MAGAZINE Editor's Choice Feb. 18, 1987

Standard-286/8™ runs at switchable speeds of 6 and 8MHz. Includes 512KB RAM expandable to 1MB, internal clock/calendar with battery backup, math coprocessor socket, six 16-bit expansion slots, two 8-bit expansion slots, 1.2MB floppy drive, 200-watt power supply, and your choice of enhanced 101-key, AT-style, or 5151 keyboard. Scores 8.8 on Norton's SI Benchmark 4.0 test at 0 wait state. Monitor is optional.
63105 $1045

63177

"We found the Standard Brand 286/12 to be a fast and versatile AT-compatible."

Computer Buyer's Guide and Handbook, Volume V, Issue 5

Standard-286/12™ runs at switchable speeds of 6 and 12MHz with no wait state. It includes 1MB RAM, internal clock/calendar with battery backup, math coprocessor socket, six 16-bit expansion slots, two 8-bit expansion slots, 200-watt power supply, 1.2MB floppy drive, dual floppy/hard drive controller, and your choice of enhanced 101-key, AT-style, or 5151 keyboard. The Standard-286/12 at 0 wait state scores 13.7 on Norton's SI Benchmark 4.0 test. Monitor is optional.
63177 $1345

The Standard-286/10, 10MHz AT-compatible computer is also available. Turn to page 3.

STANDARD BRAND™
PC/XT® -COMPATIBLE COMPUTERS

Standard Turbo/10™ uses an 8088 processor with selectable processing speeds of 4.77 and 10MHz. The system includes 640KB RAM, math coprocessor socket, 360KB floppy drive and controller, eight expansion slots, 150-watt power supply, and your choice of enhanced 101-key, AT-style, or 5151 keyboard. Monitor is optional.
63050 $629

Standard Turbo/8™ offers an 8088 processor with switchable operating speeds of 4.77MHz and 8MHz. The system includes 256KB RAM, a math coprocessor socket, a 360KB floppy drive and controller, eight expansion slots, 150-watt power supply, and your choice of enhanced 101-key, AT-style, or 5151 keyboard. Monitor is optional.
63010 $499

63050

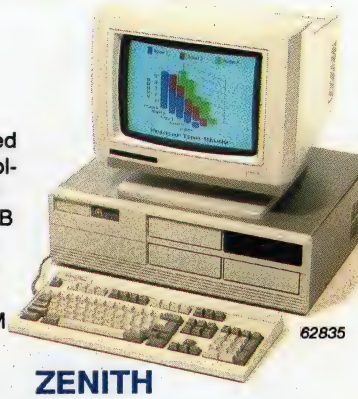
ZENITH data systems

62821

ZENITH COMPUTERS

Z-181 boasts perhaps the most advanced LCD screen available. System includes 640KB RAM and runs at 4.77 or 8MHz. The computer has twin 720KB floppy drives and runs PC/XT-compatible software. Other features include: MS-DOS, serial port, parallel port, RGB/composite video port, interface for a hard drive, and rechargeable battery pack with AC adapter.
62810 $1575

Z-183 offers switchable speeds of 4.77MHz and 8MHz and the same built-in, backlit, supertwist screen as the Z-181 plus 640KB RAM (expandable to 1.64MB), a 21MB RLL hard drive, a 720KB floppy drive, battery options, a convenient built-in handle, a serial port, a parallel port, and an enhanced keyboard.
62821 $2495


62835

Z-386 is a 16MHz system based on the advanced 80386 technology. Equipped with 1MB RAM (expandable to 16MB), a 1.2MB floppy drive, and a 40MB hard drive, the Z-386 includes such time-saving features as an enhanced page-mode static RAM and a 32-bit memory bus.
62835 $4519

ZENITH ACCESSORIES

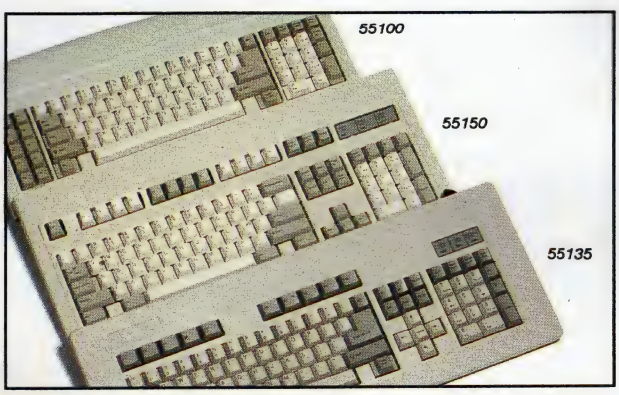
62807

Zenith carrying case with printer pocket for models 181 and 183.
62807 $49

Zenith 360KB half-height external floppy drive for the 181 and 183 models.
62809 $319

Zenith interface cable for the 5.25" drive.
62808 $39

See page 14 for Zenith modems.



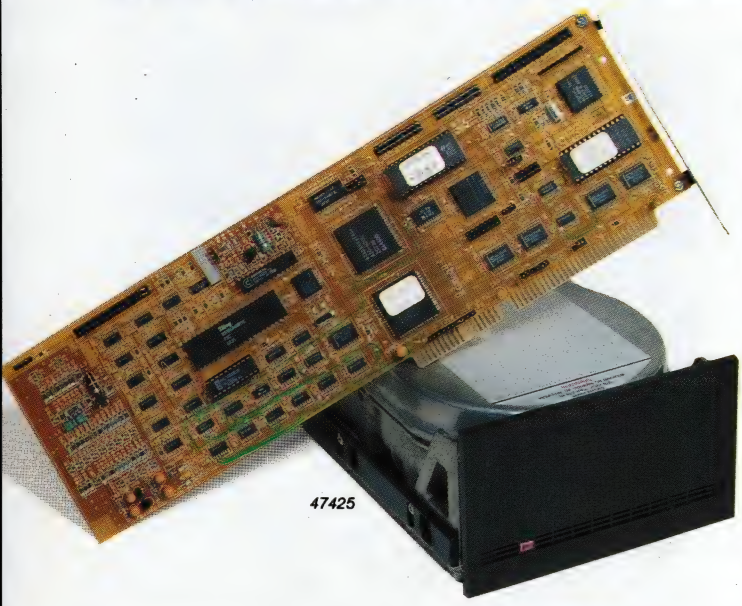
KEYBOARDS

AT-style 5060 keyboard has 84 keys and an enlarged enter and shift keys for easy operation.
55100 $69

Enhanced 101-key keyboard for AT or XT compatibles with 101 keys including 12 function keys.
55150 $69

5151 keyboard for the IBM PC/XT, AT, and compatibles. Includes separate numeric and cursor key pads.
55135 $69

MASS STORAGE WITH MASS APPEAL


47425

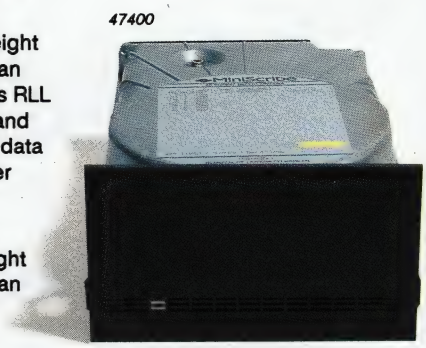
These popular AT-compatible hard drives give you fast access to stored data.

Hard drives for AT compatibles include: drive, data cable, mounting hardware, manual, and free PC-FullBak® disk backup software. Hard drives above 30MB come with partitioning software.

MiniScribe 110MB full-height hard drive for the AT with an access time of 28ms. Uses RLL encoding, 1:1 interleave, and has a 7.5MBit per second data transfer rate. RLL controller card included.
47425 $1189

MiniScribe 71MB full-height hard drive for the AT with an access time of 28ms.
47400 $799

47400



Seagate 40MB half-height hard drive for the AT with an access time of 28ms.
47207 $459

Seagate™ 20MB half-height hard drive for the AT with an access time of 65ms.
47003 $299

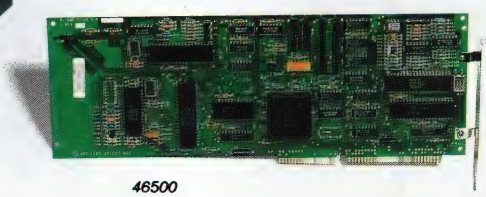
MiniScribe 43MB half-height hard drive for the AT with an access time of 25ms.
47204 $569

MiniScribe 40MB half-height hard drive for the AT with an access time of 61ms.
47203 $399

47003

47207

HARD DRIVE CONTROLLER

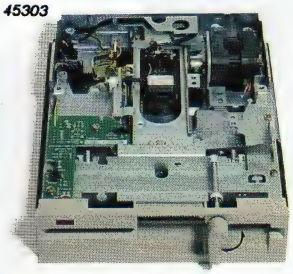

46500

Western Digital® AT dual floppy/hard drive controller coordinates your computer, your hard drive, and your floppy.
46500 $149

FLOPPY DRIVES

Floppy drives allow you to store information on removable and portable diskettes.

45303



360KB Teac® floppy drive for the AT (grey).
45303 $109

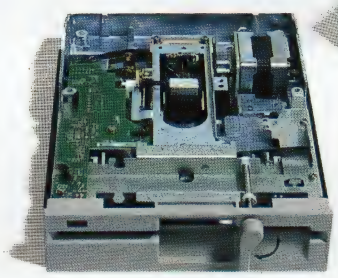
45302

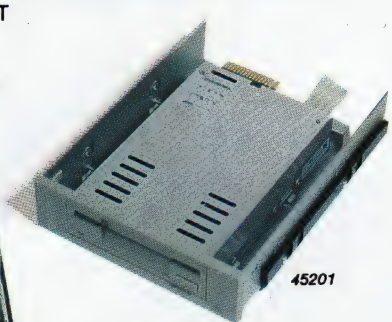
360KB half-height floppy drive for the AT (grey).
45302 $109

1.2MB floppy drive for the AT (grey).
45350 $109

1.2MB Teac floppy drive for the AT (grey).
45351 $119

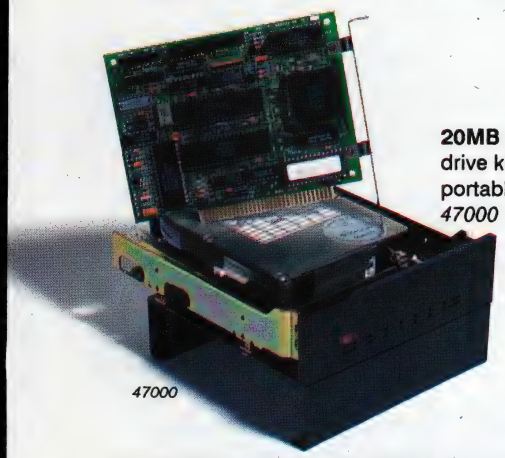
45351



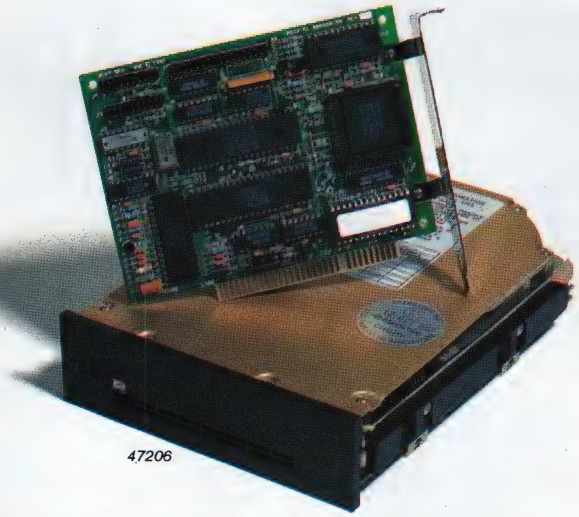

45201

720KB half-height 3.5" floppy drive (grey).
45201 $115

These leading PC/XT-compatible hard drives are easy on the wallet.


47000

20MB 3.5" half-height hard drive kit suitable for Compaq portables.
47000 $299


47206

Seagate 20MB half-height hard drive for the PC/XT with an access time of 65ms.
47002 $289

MiniScribe 20MB half-height hard drive for the PC/XT with an access time of 65ms.
47001 $279

MiniScribe 40MB half-height hard drive for the PC/XT with an access time of 61ms.
47206 $395

Hard drive kits for PC/XT compatibles include: drive, cables, mounting hardware, controller card, complete manual, and free PC-FullBak disk backup software.

STRIKE IT RICH WITH THE FLASHCARD-49!

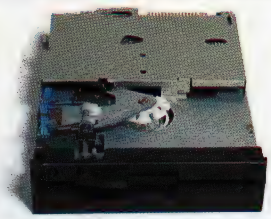
When you uncover the FlashCard-49, you'll discover a motherload of high-capacity, high-speed mass storage -- all on a card and at a fraction of the price of other comparable hard-cards.

47208

47208 FlashCard-49™, 49MB Seagate, 28ms. *$549*
47104 FlashCard-30™, 30MB MiniScribe, 65ms. *$339*
47005 FlashCard-20™, 20MB MiniScribe, 65ms. *$319*

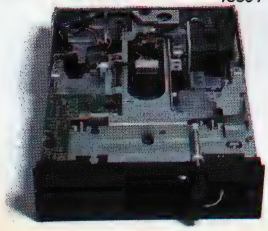
PC MAGAZINE

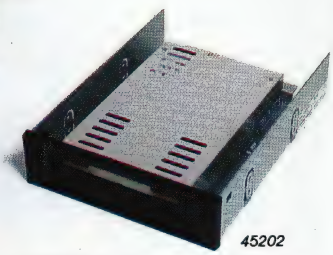
The FlashCard-20 and FlashCard-30 were PC Magazine Editor's Choice. February 20, 1987.


45300

360KB half-height floppy drive for the PC/XT (black).
45300 $99

360KB Teac floppy drive for the PC/XT (black).
45301 $109


45301


45202

720KB half-height 3.5" floppy drive (black).
45202 $109

CONTROLLERS

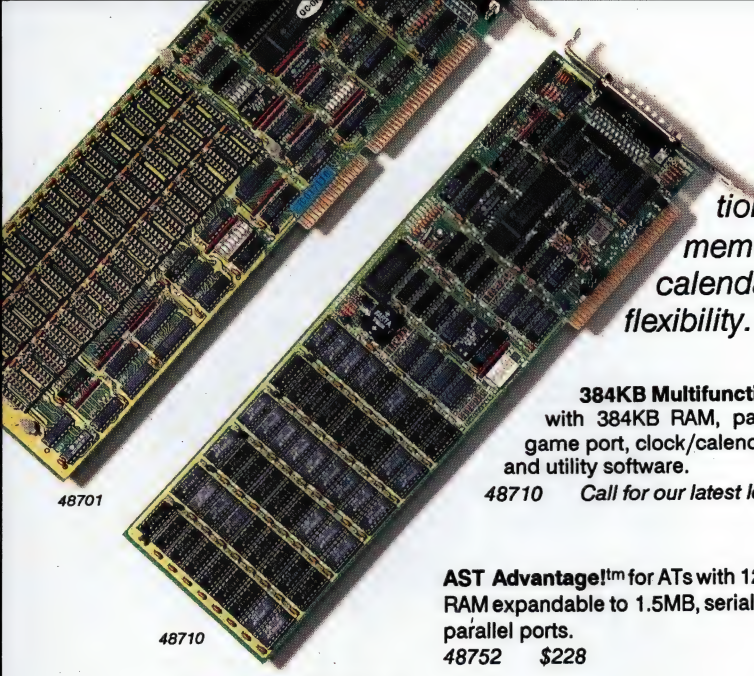
Floppy controller card operates two PC/XT-compatible floppy drives efficiently.
46300 $39

Western Digital PC/XT hard drive controller provides smooth hard drive operations.
46502 $79

46502
46300

MULTIFUNCTION CARDS

Multifunction cards provide a variety of options including additional random-access memory (RAM), ports, and real-time clock/calendars, to increase your system's speed and flexibility.



48701

48710

384KB Multifunction card for your PC/XT with 384KB RAM, parallel port, serial port, game port, clock/calendar with battery backup, and utility software.
48710 Call for our latest low price.

AT-Multifunction card with 0KB is expandable to 1.5MB and supports either 64KB or 256KB chips. Includes serial and parallel ports.
48701 $110

AST Advantage!tm for ATs with 128KB RAM expandable to 1.5MB, serial, and parallel ports.
48752 $228

AT-MFC Memory Piggyback with 0KB is expandable to 1.5MB RAM for increased memory storage.
48901 $25

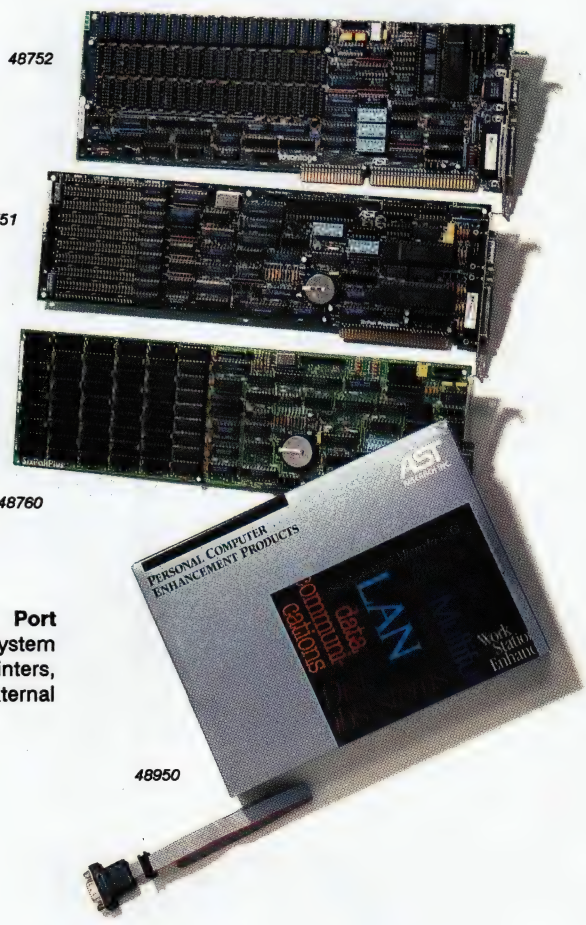
AST SixPakPremiumtm for PC/XTs with 256KB RAM expandable up to 2MB, serial port, parallel port, clock/calendar, and software. Supports Lotus/Intel/Microsoft and AST expanded memory specifications.
48751 $197

Second Serial Port Option for the AT/XT input/output or AT MFC cards provides for system expansion.
48900 $20

AST SixPakPlus® for PCs with 384KB RAM, serial port, parallel port, clock/calendar with battery backup, and utility software.
48760 $259

48900

48901



48752

48751

48760

AST Advantage Serial Port adds a serial port to your system for use with certain printers, pointing devices, or external modems.
48950 $19

48950

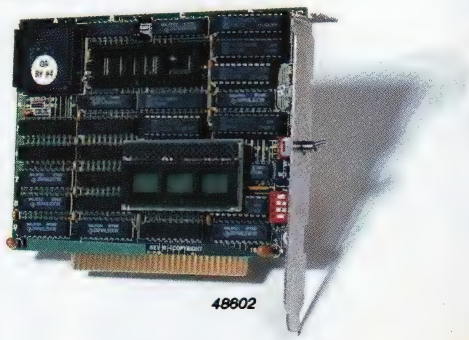
ACCELERATORS

Increase your PC's processing speed to turbo speeds (higher than 4.77MHz) with an accelerator card.

48601

Orchid TinyTurbo 286tm board gives your PC/XT the power of an AT.
48601 $299

Charge Card 286tm makes your PC/XT run 6.6 times faster.
48602 $269



48602

MEMORY CARDS

Extra memory allows you to run more powerful applications and may increase the operational speed of a program.

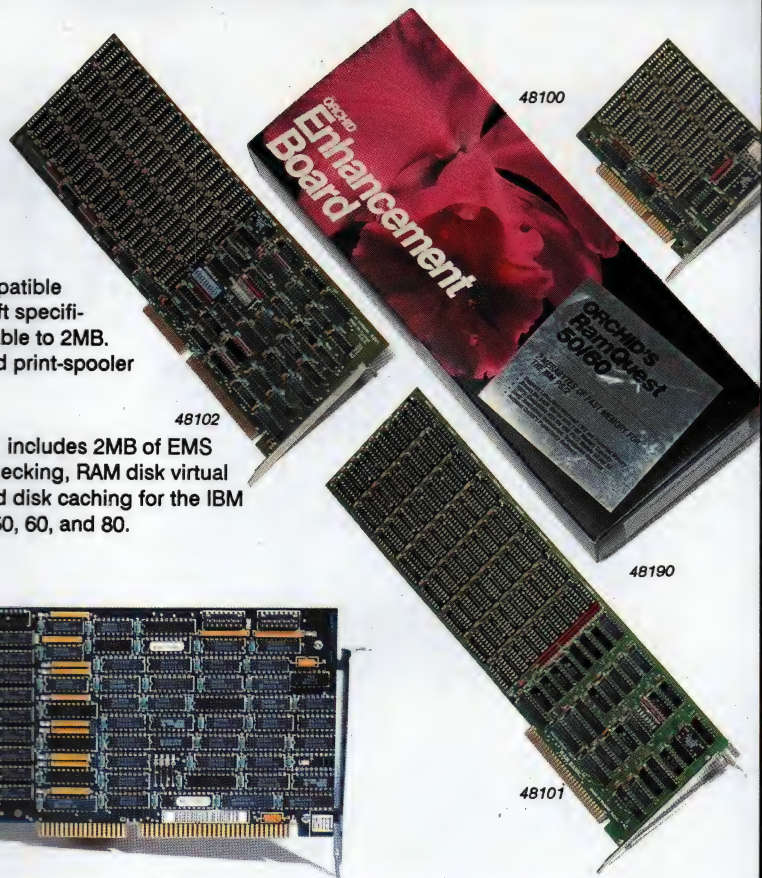
Mem-576 short card for the XT supports either 64KB or 256KB chips. It comes with 0KB and is expandable up to 192, 384, or 576KB.
48100 $35

XT EMS Card (Expansion-Memory-Specification) for the XT, with 0KB expands to 2MB and is compatible with the Lotus/Intel/Microsoft specification. Includes virtual RAM disk and print-spooler software.
48101 $99

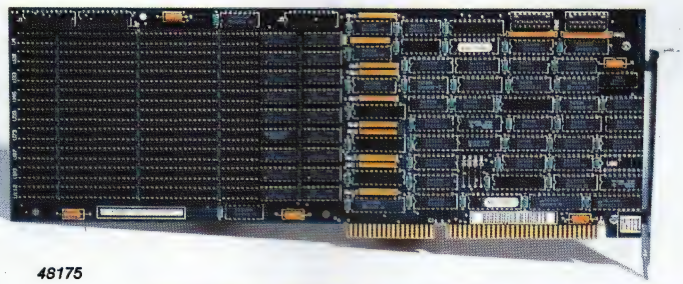
Intel Above™ Board 286 for AT/PC/XT supplies three memory boards in one: conventional, expanded, and extended. Includes 512KB expandable to 2MB.
48175 $349

EMS Card for the AT is compatible with the Lotus/Intel/Microsoft specification and has 0KB expandable to 2MB. Includes virtual RAM disk and print-spooler software.
48102 $119

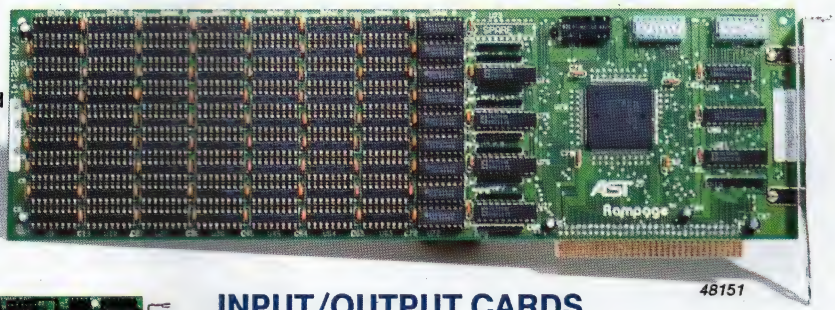
Orchid RamQuest 50/60™ includes 2MB of EMS memory, automatic parity checking, RAM disk virtual storaging, print spooling, and disk caching for the IBM Personal System/2 models 50, 60, and 80.
48190 $669



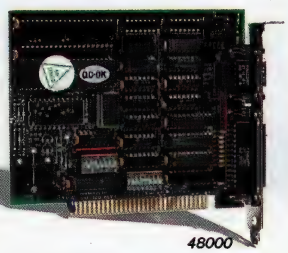
48100 48102 48190 48101

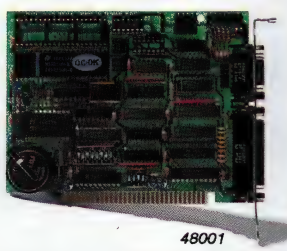

48175

AST RAMpage/2™ expanded memory board comes with 64KB RAM expandable to 2MB.
48151 $229



48151


48000


48001

INPUT/OUTPUT CARDS

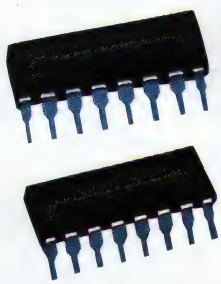
Add a serial or parallel port to your system with an economical I/O card.

I/O Card for AT compatibles with serial port and parallel port.
48000 $59

I/O Card for PC compatibles with serial port, parallel port, game port, and clock/calendar with battery back up.
48001 $65

RAM CHIPS

Come in sets of 9 with a one-year warranty.

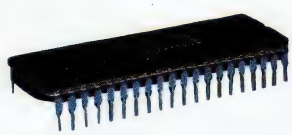


50603	256KB chip set for AT (80 nanoseconds).
50600	256KB chip set (100 nanoseconds).
50601	256KB chip set for AT (120 nano seconds).
50602	256KB chip set (150 nanoseconds).
50501	64KB chip set (120 nanoseconds).

Call for our latest low prices.

MATH COPROCESSORS

Math coprocessors speed up your calculations.



8087-3 Math coprocessor (5MHz).
50200 $129

8087-2 Math coprocessor (8MHz).
50201 $159

80287-6 Math coprocessor (6 MHz).
50250 $219

80287-8 Math coprocessor (8 MHz).
50251 $269

80287-10 Math coprocessor (10MHz).
50252 $349

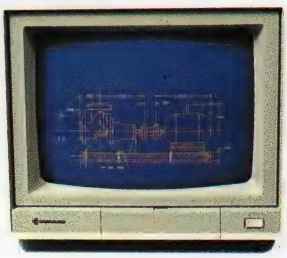
80387-16 Math coprocessor (16MHz).
50275 $525

80387-20 Math coprocessor (20MHz).
50277 $779

MONOCHROME MONITORS

51001

Samsung[tm] **12" flat** screen amber monochrome monitor with tilt/swivel base.
51001 $95



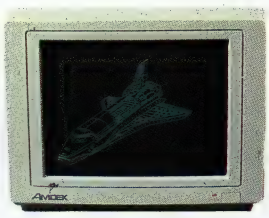
51000

Samsung 12" curved screen amber monochrome monitor.
51000 $89

51002

51003

Amdek® **300A** for Apple or IBM is a composite 12" amber monochrome monitor. It requires a color card to work in IBM compatibles.
51002 $129



51006

Amdek 310A with a 12", high-resolution amber monochrome monitor.
51003 $135

Amdek 410W black and white display, with 12" flat screen
51006 $159

51004

Quadram Amberchrome[tm] **12"** with a high-resolution 12" amber display.
51004 $119

MONOCHROME GRAPHICS CARDS

Monochrome monitors require a monographics video card except where indicated.

Hercules[tm] **Monochrome Graphics Card Plus** is the world's best-selling graphics and adapter board. Monochrome display with high-resolution graphics and text display. Includes parallel port.
48350 $179

Monographics Card is a high-resolution monochrome graphics card. Includes parallel port.
48301 $65

48301

48350

COLOR MONITORS

51101

Princeton® HX-12+ is a color monitor with a .28mm dot pitch, 770x200 line resolution, and 18MHz bandwidth.
51101 $399

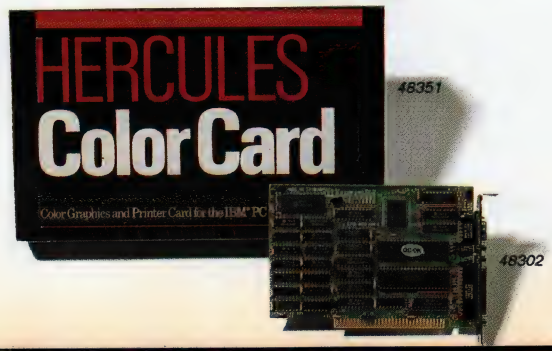
51100

IBM-compatible color monitor with 12" screen.
51100 $239

COLOR GRAPHICS CARDS

Hercules Color Graphics Card has color graphics and printer port for the AT/PC on a space-saving half-size card.
48351 $149

Color Graphics Card is a high-resolution color graphics adapter that operates in both color and composite mode. Includes a parallel port.
48302 $59



48351

48302

EGA MONITORS

Enhance your system with either of these fine EGA color monitors that gives superior resolution and color.

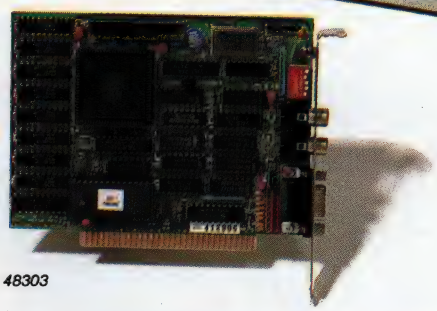
51201

IBM-compatible 14" EGA monitor offers the best value in an enhanced color monitor. Its industry standard 14" tube with 13" (diagonal) screen offers .31mm dot pitch and high resolution.
51201 $349

51202

NEC Multisync® II, one of the finest multisynchronous monitors available, adjusts to any horizontal synchronization frequency between 15.5KHz and 31.7KHz. It has a resolution up to 800x675, and supports both TTL and analog inputs. The 14" display has a 30MHz bandwidth and .31mm dot pitch.
51202 $679

48376



48303

EGA/VGA CARDS

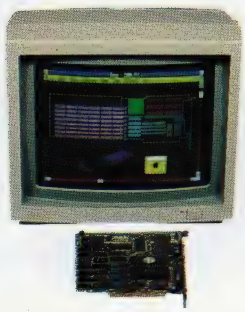
Video-7® Vega VGA card, compatible with all existing IBM graphic/text standards, has resolutions of 640x480 and 800x600 with 16/64 color capability. Used with an analog monitor, it has 640x480 resolution with 16/262,144 color capability or 320x200 with 256/262,144. Supports popular software packages.
48377 $299

Video-7 Vega Deluxe™ EGA card supports EGA, CGA, and monographics displays. Capable of 37% higher resolution with the NEC Multisync II or other multisynchronous monitors and appropriate software.
48376 $249

EGA-480 card is an IBM/EGA-compatible card with 256KB display memory, and 16/64 color capability. The EGA-480 automatically configures itself to a resolution of 640x350 or 640x480, depending on your monitor.
48304 $159

EGA-350 card is IBM-EGA compatible, has 256KB display memory, high-resolution (640x350) graphics mode, and displays 64 colors, 16 at a time. It supports EGA, CGA, and monochrome displays.
48303 $129

VIDEO COMBOS



Upgrade or enhance your system with our quality video combos in monographics, color, or enhanced graphics.

Flatscreen Monographics Combo

Includes Samsung 12" flat screen monitor with tilt and swivel base, and monographics video card.

51700 ***$139***

Color Graphics Adapter (CGA) Combo

Includes 12" color monitor and color card.

51701 ***$289***

Enhanced Graphics Adapter (EGA) Combo

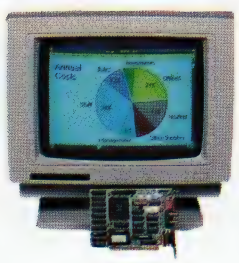
Includes a 14" industry standard tube with 13" diagonal EGA monitor and EGA-350 card.

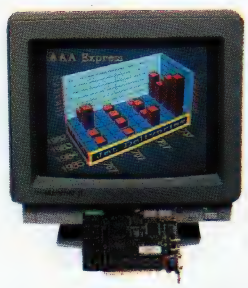
51702 ***$469***

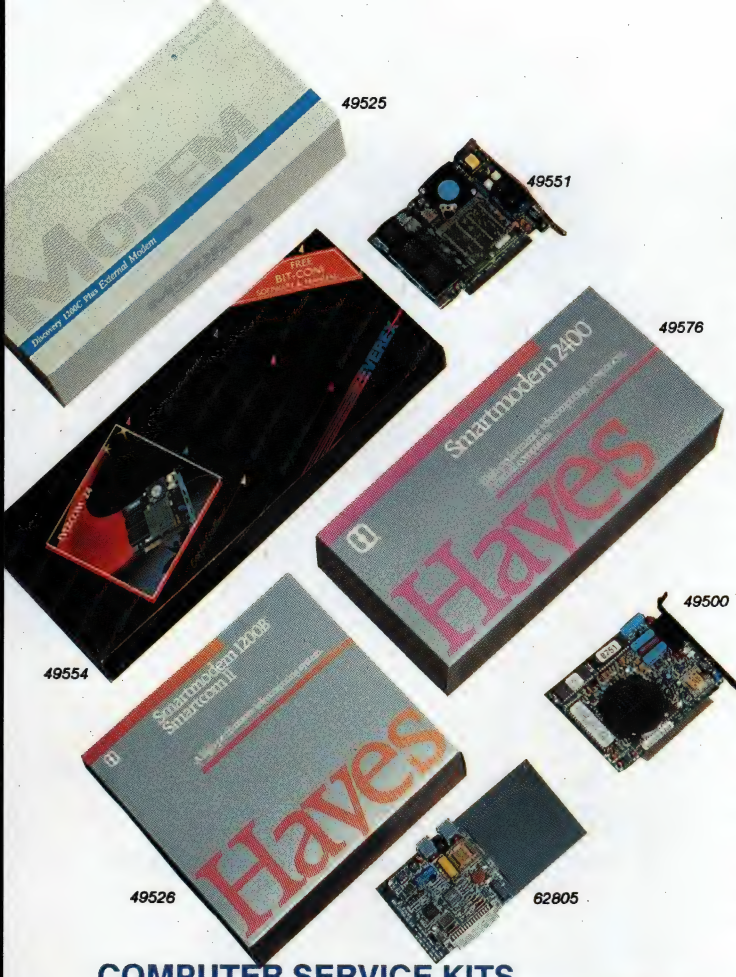
Ultimate EGA Combo

Includes the NEC Multisync II monitor and a Video-7 Vega Deluxe EGA card.

51703 ***$869***







MODEMS

Modems allow your computer to communicate with other computers over telephone lines. The greater the baud rate, the more quickly your data is transmitted.

Internal Modems

1200 baud 1/2 card internal modem with software.
49500 $69

2400 baud internal modem with software.
49553 $139

Everex Evercom™ 1200 baud 1/2 card internal modem with software.
49502 $99

Everex Evercom 2400 baud 1/2 card internal modem with software.
49551 $189

Everex Evercom II 24™ 2400 baud internal modem designed for the Micro Channel™ architecture of the Personal System/2™. Includes communications software.
49554 $179

Hayes Smartmodem™ 1200B 1200 baud 1/2 card internal modem with Smartcom II® software.
49526 $299

Hayes 2400B 2400 baud internal modem.
49552 $449

Zenith 1200 baud internal modem.
62805 $209

Zenith 2400 baud internal modem for Zenith 181 and 183 models.
62806 $472

External Modems

External modems require a serial port and cable.

1200 baud external modem.
49525 $89

2400 baud external modem.
49557 $159

Everex 2400 external modem.
49575 $239

Hayes Smartmodem 1200 baud external modem.
49501 $319

Hayes 2400 baud external modem.
49576 $469

COMPUTER SERVICE KITS

Computer Service kits are handy versatile kits that keep all the necessary tools for maintaining your computer right at your fingertips.

Basic Tool Kit includes chip inserter, extractor, 3-claw holder, tweezers, four screwdrivers, four nutdrivers, and torque screwdriver in a vinyl case.
41131 $14

Soldering Tool Kit includes chip inserter, extractor, anti-static wrist strap, coiled ground cord, soldering iron, desoldering tool, various solder tools, pliers, and clippers in a vinyl case.
41132 $29

Advanced Tool Kit includes chip inserter, chip and square chip extractors, anti-static wrist strap, multiple screwdriver with six extensions, two nutdrivers, and two torque screwdrivers in a vinyl case.
41133 $35

Troubleshooting Tool Kit includes chip inserter, chip and square chip extractors, anti-static wrist strap, multiple screwdriver with six extensions, two nutdrivers, and two torque screwdrivers, a logic probe, a logic pulser, and a 3-piece tweezer set in a vinyl case.
41134 $79

TANDY® -COMPATIBLE PRODUCTS

Introducing CompuAdd's new line of compatible add-on products for Tandy MS-DOS computers.

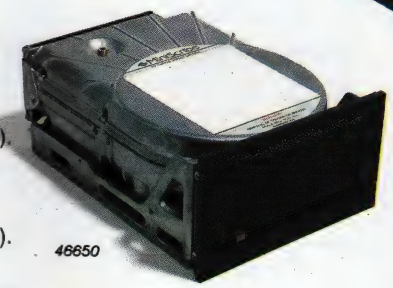
INTERNAL HARD DRIVES

Hard drive kits include: MiniScribe drive, drive controller, mounting hardware, cable, manual, and installation guide.

20MB half-height hard drive for Tandy 1000/A/SX/TX (65ms).
46600 $319

20MB half-height hard drive for Tandy 3000 HL (65ms).
46602 $375

40MB half-height hard drive for Tandy 1000/A/SX/TX (61ms).
46630 $395



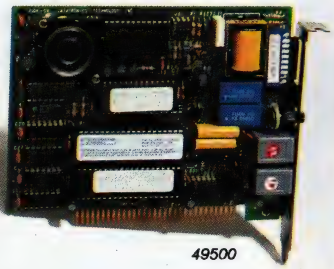
43MB half-height hard drive for Tandy 3000 HL (25ms).
46632 $749

71MB full-height hard drive for Tandy 3000 HL (28ms).
46650 $999

MODEMS

1200 baud internal modem is a Hayes-compatible 1/2 card with 5.25" format communications software.
49500 $69

1200 baud external modem is Hayes-compatible.
49525 $89

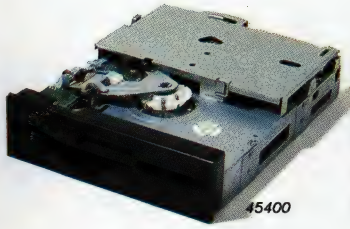


CABLES

Parallel printer cable, 6', Centronics.

39628 For Tandy 1000 models (CE34-C36m). *$8.95*

39625 For Tandy 3000 HL models (DB25M-C36M). *$8.95*



FLOPPY DRIVES

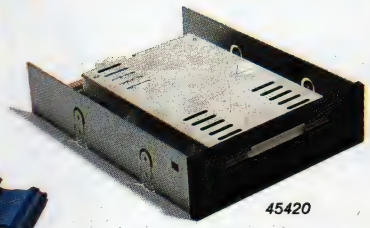
Floppy drive kits include: drive, mounting hardware, cable, and installation guide.

360KB floppy drive for Tandy 1000/A/SX/TX.
45400 $99

360KB floppy drive for Tandy 3000 HL.
45401 $99

720KB floppy drive for Tandy 1000/A/SX/TX.
45420 $109

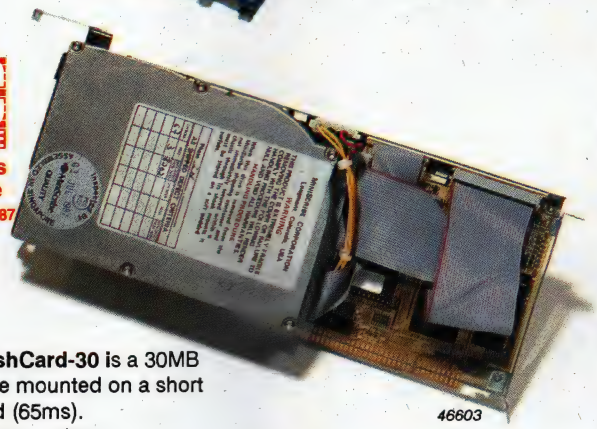
1.2MB floppy drive for Tandy 3000 HL.
45440 $109



FLASHCARDS

The FlashCard™ simplifies fast disk storage by mounting a 3.5" drive and controller together in one compact package.

PC MAGAZINE Editor's Choice Feb. 20, 1987



FlashCard-20 is a 20MB drive mounted on a short card (65ms).
46603 $359

FlashCard-30 is a 30MB drive mounted on a short card (65ms).
46620 $379

PC MAGAZINE Editor's Choice Jan. 27, 1987

Logitech Serial Mouse is a programmable mouse with three buttons to position data, create graphics, or edit text. Includes 5.25" software and manual. *PC Magazine* Editor's Choice. Serial port interface required.
55050 $79

TANDY COMPATIBILITY QUICK REFERENCE BY PART NUMBER

	1000	1000-A	1000-EX	1000-HX	1000-SX	1000-TX	3000-HL
20MB PC Hard disk	46600★	46600★	No	No	46600	46600	46602■
40MB PC Hard disk	46630★	46630★	No	No	46630	46630	No
43MB AT Hard disk	No	No	No	No	No	No	46632■
71MB AT Hard disk	No	No	No	No	No	No	46650■
Internal modem	49525	49525	No	No	49525	49525	49525
External modem	49500✓	49500✓	49500•	49500•	49500✓	49500	49500✓
Printer cable	39628	39628	39628	39628	39628	39628	39625
5.25" 360KB Floppy disk	45400	45400	No	No	45400	45400	45401
5.25" 1.2MB Floppy disk	No	No	No	No	No	No	45440
3.5" 720KB Floppy disk	45420	45420	No	No	45420	45420	No
20MB FlashCard	46603★	46603★	No	No	46603	46603	No
30MB FlashCard	46620★	46620★	No	No	46620	46620	No
Logitech serial mouse	55050✓	55050✓	55050•	55050•	55050✓	55050	55050✓

KEY

- ★ Requires Tandy 256/384KB RAM/DMA upgrade.
- ✓ Requires Tandy serial port upgrade.
- • Requires Tandy "Plus" style serial port upgrade.
- ■ Includes hard disk controller card.

OFFICE SUPPLIES

CLEANERS

Clean up your computer's act. A clean system means that your data will be protected better and your system will perform smoothly.

Head cleaning kit for 5.25" disk drive.
41001 $12

Head cleaning kit for 3.5" disk drive.
41000 $15

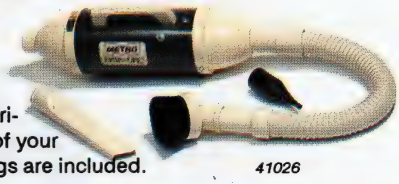
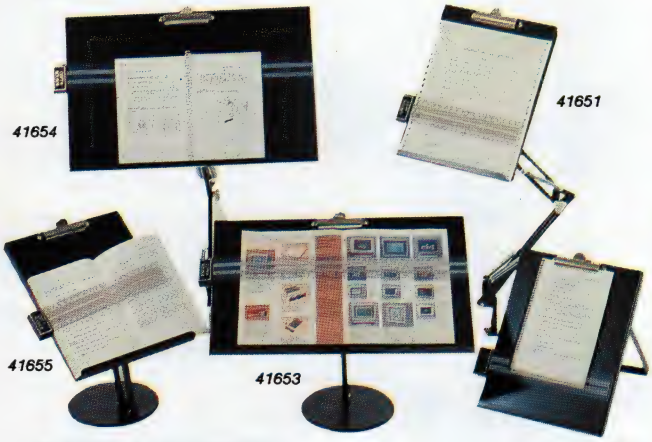
Microcomputer cleaning kit (for complete cleaning including 5.25" floppy drives and screen).
41015 $25

Compuduster.
41010 $24

Screen cleaning kit.
41020 $16

Mini vacuum helps remove the dust that accumulates on your keyboard.
41025 $9

Data-Vac® is a lightweight vacuum/blower (three pounds) equipped with a 19" flexible hose, a shoulder strap, and three attachments for intricate precision cleaning of your system. Five vacuum bags are included.
41026 $49



COPY HOLDERS

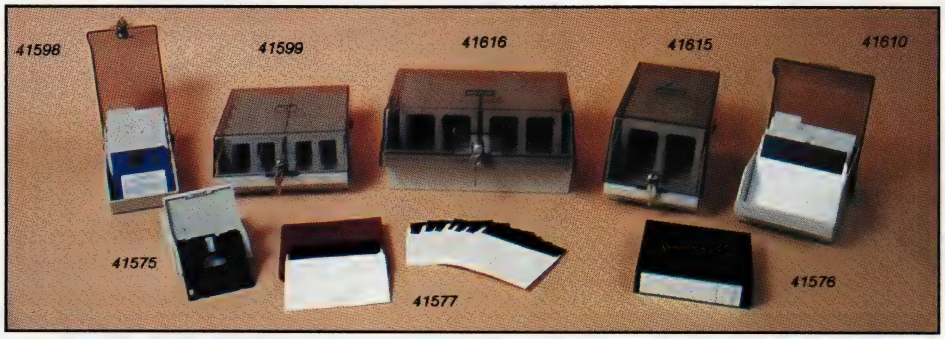
41650 Copy holder with stand 9.5x11". *$7*
41651 Copy holder with adjustable arm 9.5x11". *$11*
41653 Copy holder with stand 19x12". *$19*
41654 Copy holder with adjustable arm 19x12". *$22*
41655 Copy holder with stand 9.5x11". *$9*

MONITOR STANDS

Monitor stands allow you to position your computer screen for easier viewing.

12" Tilt/swivel monitor stand.
41565 $12

14" Tilt/swivel monitor stand.
41566 $14

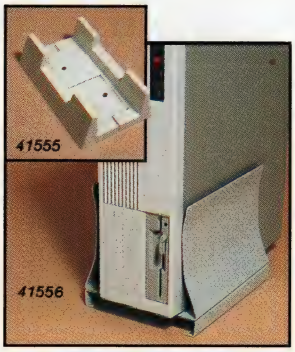


SYSTEM STANDS

Increase your work area by putting your computer under the desk with a system stand.

Plastic vertical system stand.
41555 $13

Metal vertical system stand.
41556 $19



FLOPPY STORAGE

Safeguard your floppies from accidental damage with durable file boxes that get disks out of the desktop danger zone.

File boxes for 5.25" floppies.
41610 For 50 floppies, without lock. *$4.99*
41615 For 100 floppies, with lock. *$6.49*
41616 For 120 floppies, with lock. *$7.49*

File boxes for 3.5" floppies.
41598 For 40 floppies, without lock. *$4.49*
41599 For 80 floppies, with lock. *$6.49*

Cases for 5.25" floppies.
41576 For 10 floppies. *$2*
41577 For 6 floppies. *$1.25*

Case for 3.5" floppies.
41575 For 10 floppies. *$2*

Portable carry-case with handle for 5.25" floppies.
41617 For 120 floppies, with lock. *$25*

FOR FAST DELIVERY, CALL 1-800-727-2966

ORDERING BY PHONE

Use the order form to plan your purchases, then call the number above between 8am - 9pm Monday - Friday or 9am - 5pm Saturday, CST. We accept VISA and Master Card. COD orders ($50 minimum) must be paid for with a money order or cash.

ORDERING BY MAIL

Complete the order form and mail it to **CompuAdd, 12303-G Technology Blvd., Austin, Texas 78727**. Be sure to include your name, address and method of payment. COD orders ($50 minimum) must be paid for with a money order or cash.

SHIPPING INFORMATION

Please add 2% of your order to cover shipping and handling costs (minimum $2). Next-day or second-day UPS service is also available - call for details and prices.

Check your order carefully to ensure that all items are present and in good condition. Claims for incomplete orders must be submitted within ten days. If there is a question about your order, contact us immediately. If your order has been damaged in transit, contact the nearest UPS office within ten days and file a claim. Keep the original shipping carton for UPS' inspection. The carrier is responsible for damage incurred during shipment.

WARRANTY INFORMATION

CompuAdd provides a limited one-year warranty on most of the products it sells. For specific warranty information, please ask our salespeople or write to the address above.

RETURNS

CompuAdd offers a 30-day money-back guarantee on hardware products. We will refund the purchase price of the product (excluding shipping and handling). All items must be shipped insurance and freight prepaid, and accompanied by a return merchandise authorization (RMA) number. All items must be in original, like-new condition, including all packaging material and documentation. We will not accept returns sent COD.

BILLING ADDRESS

PHONE NUMBER DATE

FIRST NAME LAST NAME

COMPANY NAME IF APPLICABLE

STREET ADDRESS APT/BLDG/SUITE

CITY STATE ZIP CODE

SHIPPING ADDRESS
(if different from billing address)

PHONE NUMBER

FIRST NAME LAST NAME

COMPANY NAME IF APPLICABLE

STREET ADDRESS APT/BLDG/SUITE

CITY STATE ZIP CODE

QUANTITY	PRODUCT NUMBER	PAGE NUMBER	DESCRIPTION	UNIT PRICE	SUBTOTAL

METHOD OF PAYMENT

___VISA ___MasterCard ___Check

___Cashiers' Check / COD ___Money Order

_____ _____

Account Number Exp. Date

Bank Name on Card_____

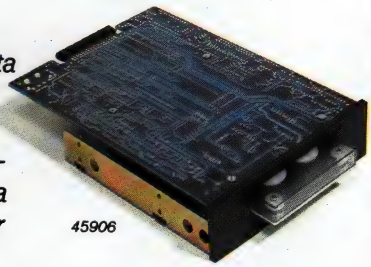
SUBTOTAL	
SALES TAX Texas Residents: Add 8% Sales Tax	
SHIPPING Please add 2% of your order to cover shipping and handling costs (minimum $2).	
TOTAL	

***CUSTOMERS OUTSIDE THE CONTINENTAL U.S.:**
Please call us at (512) 258-5575 for ordering information.

Prices subject to change without notice 4/88

TAPE BACKUP SYSTEMS

Protect the valuable data and software stored on your hard drive with regular backups. Transferred to tape, your data is safe in case of power or computer failure. Software is included with each backup system.



45905 40MB internal tape backup for the AT. *$389*

45906 40MB internal tape backup for the XT. *$389*

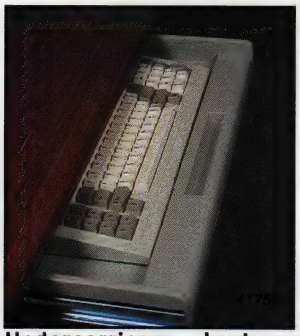
45950 60MB internal tape backup. *$757*

57801 20/40MB tape cartridge. *$21.99*

57850 60MB tape cartridge. *$29.95*

KEYBOARD DRAWERS

Keyboard drawers provide convenient storage and protect your keyboard from the detrimental effects of dirt.



Undercarriage keyboard drawer attaches easily under desktop or shelf. Inside dimensions are 22.4" x 10.1" x 3.6".
41753 *$17*

Keyboard drawer for out-of-the-way storage under CPU or monitor.
41750 *$24*

Keyboard drawer with power center allows you to switch on your peripherals from a convenient central location.
41751 *$59*

BLANK FLOPPIES

All floppies come in boxes of 10.

5 .25" Floppies:

57000 360KB DS/DD. *$7*

57004 360KB Maxell® DS/DD. *$9*

57002 360KB Verbatim® DS/DD. *$10*

57200 1.2MB DS/HD. *$15*

57202 1.2MB Maxell DS/HD. *$18*

57201 1.2MB Verbatim DS/HD. *$19*

3 .5" Floppies:

57401 720KB Sony® DS/DD. *$19*

57440 1.44MB Sony DS/HD. *$55*

STATIC MATS

Static mats dissipate static electricity before it harms your computer. Each mat includes a 10' coiled ground cord.

41075 11.5"x 22" mat. *$16*

41076 19.5"x 23.5" mat. *$19*

41077 23.5"x 25.5" mat. *$24*

EXTERNAL HARD DRIVE CHASSIS

Full-height hard-drive chassis with 45-watt power supply and cables for XT or AT.
46100 *$119*

Drive not included.

EPSON

Equity™ II+ combines power, performance, and value. Its dual speed (6 and 10MHz) 80286 processor and 640KB RAM deliver ample power for a wide range of tasks. The system also features support for an 80287 coprocessor. The system has three 16-bit expansion slots, three 8-bit expansion slots, clock/calendar, AT-style keyboard, one 360KB floppy drive, MS-DOS, GW BASIC, custom Epson utilities, and documentation.
62726 *$1150*

ABOUT COMPUADD:

OUR BEGINNINGS

CompuAdd Corp. was established in 1982 as a mail-order company specializing in diskette drives and hard drives for personal computers.

Since then, CompuAdd has become a leading distributor and manufacturer of computers, add-on products, and accessories.

THE PRESENT

In December 1987, *Inc.* magazine rated CompuAdd as the third fastest-growing privately-held company in America over the last five years.

We've been able to achieve this phenomenal growth because we offer the best possible products and customer support, while maintaining competitive prices.

THE FUTURE

CompuAdd continues to grow, and in new directions. We have several retail outlets in Dallas, Austin, and San Antonio. The State of Texas recently awarded CompuAdd a contract to sell computers and peripherals to state agencies.

Our emphasis on price, quality, and support will continue to serve our customers in the mail-order, retail, corporate, and institutional markets.

INTERNATIONAL SALES

We welcome inquiries from dealers and companies outside the United States:

Phone: 512-258-5575
FAX: 512-250-5760
Telex: 763543 COMPUADD AUS

IBM® PERSONAL SYSTEM/2™ ADD-ON PRODUCTS

Increase the performance of your IBM Personal System/2 system with these add-on products.

48190

Orchid RamQuest 50/60™ offers 2MB of EMS memory with automatic parity checking for the Personal System/2. Software-configurable, RAM disk virtual storaging, print spooling, and disk caching are some of its impressive features. RamQuest supports OS/2 and Lotus/Intel/Microsoft specifications.
48190 $669

49554

Everex Evercom II 24™ 2400 baud internal modem with software is designed specifically for use with the Micro Channel™ architecture of the Personal System/2. Also included is the BitCom software which stores up to 32,000 numbers for auto-dialing. Other modem features include auto-answer, auto-sensing of tone/pulse dialing, and auto-voice switchover.
49554 $179

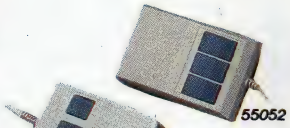
62554

External 5.25" drive provides your IBM PS/2 with AT/XT 5.25" compatiblity without requiring use of an expansion slot. No external power cord needed. It installs as drive B and permits read and write bidirectional transfer of data from 360KB to 720KB format. Includes board, cable, and floppy drive. Compatible with IBM PS/2 Models 30, 50, 60, and 80.
62554 $269

POINTING DEVICES

Mouse

Essential for desktop publishing, the mouse can also be used in many programs to provide easy cursor movement.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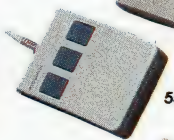
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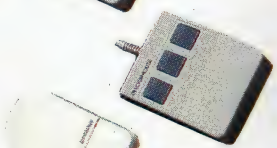
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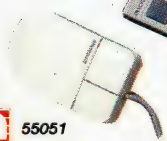
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Standard Brand™ Mouse is a three-button optical/mechanical mouse that is compatible with the Microsoft Serial Mouse and Mouse Systems PC Mouse.
55052 $55

Logitech® Serial Mouse is a programmable mouse with three buttons to position data, create graphics, or edit text. Includes software and manual. *PC Magazine* Editor's Choice (Jan. 27, 1987). Serial port interface required.
55050 $79

PC MAGAZINE Editor's Choice

Logitech Bus Mouse is a three-button optical mouse that offers high resolution (200 dpi) and maximum compatibility with most software. Includes bus interface card.
55049 $89

Microsoft® Bus Mouse is a mechanical mouse with bus interface that doesn't require the use of a serial port.
55051 $119

55000

55001

Joysticks

The joystick requires a game port.

55000 Standard Brand joystick. *$19.95*

55001 Mach III joystick with fire button. *$35*

39625

39627

39661

CABLES

39625 Parallel Printer Cable 6' (DB25M to C36M). *$8.95*
39627 Parallel Printer Cable 10' (DB25M to C36M). *$11.95*
39660 AT Serial Pigtail Cable 2' (DB9F to DB25M). *$4.95*
39661 AT Serial Cable 6' (DB9F to DB25M). *$7.95*
39663 AT Serial Cable 10' (DB9F to DB25M). *$10.95*
39655 XT Serial Cable 6' (DB25F to DB25M). *$7.95*
39657 XT Serial Cable 10' (DB25F to DB25M). *$10.95*
39675 Hewlett-Packard Serial Cable 6' (DB25F-DB25M). *$7.95*
39677 Hewlett-Packard Serial Cable 10' (DB25F-DB25M). *$10.95*
39700 Full Pin Cable 6' (DB25M to DB25F). *$7.95*
39702 Full Pin Cable 10' (DB25M to DB25F). *$10.95*
39690 Full Pin Cable 6' (DB25M to DB25M). *$7.95*
39692 Full Pin Cable 10' (DB25M to DB25M). *$10.95*
39695 Full Pin Cable 6' (DB25F to DB25F). *$7.95*
39697 Full Pin Cable 10' (DB25F to DB25F). *$10.95*
39705 Centronics® Cable 6' (C36M to C36F). *$10.95*
39707 Centronics Cable 10' (C36M to C36F). *$13.95*
39710 Centronics Cable 6' (C36M to C36M). *$10.95*
39712 Centronics Cable 10' (C36M to C36M). *$13.95*
39610 Keyboard Extension Cable 6' coiled. *$6.95*
39615 Monitor Extension Cable 6' (DB9M to DB9F). *$6.95*

Sensational Software! Sensational Software Selection!

SOFTWARE

Word Processing

MultiMate Advantage II™ by Ashton-Tate is a flexible word processor with exhaustive conversion support for popular applications and printers. Includes extensive dictionary with legal/medical terms, custom dictionaries, spelling checker, list and file manager, and six math functions. Requires at least 384KB RAM and MS-DOS 2.0-3.2.
60025 $269

WordPerfect® by WordPerfect Corp. formats documents, prepares outlines, and generates tables of contents. Includes 115,000-word dictionary, thesaurus, and mail merge. Requires at least 256KB RAM.
60015 $215

Word® by Microsoft is a powerful word processor providing style sheets and macros for easy and professional-looking results. Requires at least 320KB RAM, DOS 2.0. Includes both 5.25 and 3.5"diskettes.
60000 $229

WordStar Professional by MicroPro, a complete word processing package including mail merge, spelling checker, and index/table of contents generator. Requires at least 192KB RAM.
60010 $239

Professional Write by Software Publishing is perfect for the professional who wants polished reports in minutes. Includes spelling checker, custom dictionary, thesaurus, and macro support. Optimized for speed. Requires at least 320KB RAM and DOS 2.0 (DOS 3.2 requires 384KB RAM). Includes both 5.25 and 3.5"diskettes.
60020 $115

Desktop Publishing & Graphics

Ventura Publisher™ page and document composition software by Xerox produces fine quality publications. Novices and experts will appreciate the handy style sheets and automatic table of contents/index generator. Requires at least 512KB RAM, DOS 2.1, hard disk, graphics controller, and pointing device.
59405 $529

Pagemaker® by Aldus assists you in creating distinguished reports, brochures, and newsletters with page formatting, layout, and design tools. Recommended configuration is an AT-compatible, 640KB RAM, DOS 3.0, one floppy drive, one 20MB hard disk, an EGA card and display, a pointing device, and a laser printer.
59400 $545

The Print Shop® by Broderbund offers a selection of 16 borders, 20 patterns and designs, and 12 type styles to create signs, banners, letterhead, and greeting cards. Choose from a library of 120 graphics or create your own. Requires at least 48KB RAM.
61050 $38

FONTASY® by Prosoft accentuates your documents with 28 type styles (supports over 275 fonts). Features graphics for simple illustrations, proportional spacing, reversal capability, and thorough online help. Requires at least 512KB RAM for 9-pin printers (640KB RAM for 24-pin printers), MS-DOS 2.0, a graphics adapter, and dot-matrix printer.
59420 $36

The Newsroom™ by Springboard makes you editor-in-chief with this word processor package that includes five type styles and sizes, automatic text layout, graphics, a clip-art collection, and modem support. Requires at least 256KB RAM, DOS 2.0 and color graphics card.
59425 $35

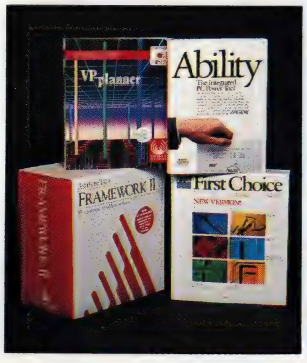
Printmaster Plus™ by Unison World creates custom fliers, banners, calendars, and stationery. You design the layout, select the type, and enter the message. Requires at least 256KB RAM, MS-DOS 2.0, a graphics card adapter. Supports most printers.
61015 $30

Windows "Draw !"™ with Clip Art by Micrographx creates diagrams and designs using pull-down menus.This interactive graphics program can be used alone or in conjunction with *Windows.* Requires at least 320KB RAM.
59820 $172

PC Paint by Mouse Systems is an easy-to-use graphics application that includes 17 fonts. Merge graphs from other programs to create comprehensive presentations. Requires at least 256KB RAM, MS-DOS, a graphics adapter card, and a mouse. Supports most printers.
59800 $53

Gem Draw™ ***Plus*** by Digital Research enhances your printed materials with charts, tables, and diagrams. Includes a 40-piece clip art library. Requires at least 256KB RAM. 3.5" diskettes available free with enclosed coupon.
59815 $169

Certificate Maker™ by Springboard lets you choose from over 200 styles and 24 borders to create a variety of certificates. Features a name list file to print multiple copies. Includes 36 gold foil seals and stickers. Requires at least 256KB RAM, MS-DOS 2.1, and IBM color graphics card.
61040 $25



Spreadsheets and Integrated Packages

Framework II™ by Ashton-Tate comes complete with word processing, spreadsheets, data management, telecommunications, and graphics. Customize and create applications with the FRED™ programming language. Requires at least 384KB RAM.
60110 $345

First Choice by Software Publishing provides the beginner with accessible word processing, thesaurus/spelling checker, file management, spreadsheet analysis, business graphics, and electronic communications. Requires at least 512KB RAM and DOS 2.0. Includes both 5.25" and 3.5"diskettes.
60605 $79

The Twin Classic™ by Mosaic is an integrated package that supplies you with a spreadsheet, file manager, and presentation graphics.
60120 $55

Ability™ by Migent features word processing, spreadsheet, database, graphics, telecommunication, and audio/visual presentation applications in one software package. Requires at least 384KB RAM. The audio/visusal presentation package requires a graphics card.
60102 $59

VP-Planner® by Paperback is a multi-dimensional database that creates user-defined spreadsheets. Conserves memory by storing only the cells that actually contain information, Features user-defined macros and background mode for printing. Requires at least 256KB RAM.
60130 $55

Sensational Software! Sensational Selection!

Database Management

dBASE III® Plus by Ashton-Tate includes a fully-relational database, the dBase programming language, a built-in networking system, a data catalog, the Advanced Query system, and a day-to-day management system. Designed for the new and experienced user alike. Requires at least 256KB RAM and MS-DOS 2.0.
60600 $409

Q&Atm by Symantec answers your data management needs with a powerful database that is easy to set up, a report generator that offers advanced options for professional-looking reports, and a word processor that includes a spelling checker. Requires at least 512KB RAM. 3.5"diskettes available free with enclosed coupon. Compatible with Symphony, 1-2-3, dBASE, WordStar, MultiMate, and PFS: File.
60615 $199

Reflex® : The Analyst by Borland permits you to analyze data from five different viewpoints: form, list, graph, crosstab, and report. Generates reports and mailing labels from your database. Requires at least 384KB RAM, MS-DOS 2.0, IBM Color Graphics Adapter, Hercules Monochrome Graphics Card, or equivalent.
60610 $82

Finance

Managing your Money® by Meca includes: budgeter, checkbook, tax planner and strategist, net worth tracker, financial calculator, life insurance evaluator, investment analyzer, retirement and college planner. It even prepares your accounts payable and receivable, invoices, mailing labels--the works! Requires at least 256KB RAM, DOS 2.0.
60800 $125

Sylvia Porter's Financial Plannertm by Timeworks organizes your finances with financial planning by objectives, checkbook and checkwritig, budgeting, and financial tracking. Requires at least 256KB RAM and MS-DOS 2.0.
60810 $55

Dollars & Sense by Monogram is tailored for home or small business financial management. Prepares budgets, split transactions, records, billings, and tax estimates. Not copy protected. Requires at least 256KB RAM and DOS 2.1.
60805 $105

Security

Coffee Break by MPPi keeps sensitive information secure when you are away from your desk. The program disables the CONTROL key and covers your screen with a custom display until the chosen password is entered. Requires at least 9.7KB RAM and MS-DOS.
58595 $21

Utilities

Norton's Utilitiestm ***Advanced Edition*** by Peter Norton Software optimizes your disk for fast access time, locates 'lost' data, and performs all those practical utilities for which Norton is famous. 3.5" diskettes available with enclosed coupon.
58536 $79

Norton's Utilities by Peter Norton Software increases system performance by restoring lost files, speeding up searches, showing directory structure, converting batch files to interactive, and much more. 3.5" diskettes available with enclosed coupon.
58535 $50

PC Tools® Deluxe by Central Point Software interfaces with DOS to implement DOS commands from within other applications, manages files and subdirectories, and recovers deleted files. Requires at least 192KB RAM. Includes both 5.25" and 3.5" diskettes.
58566 $40

Sideways® by Funk customizes your spreadsheets with nine type sizes and spacing, margin, and column control. Compatible with 1-2-3 and Symphony. Requires at least 64KB. 3.5 " diskette available free with enclosed coupon.
58580 $40

Copy II® PC by Central Point Software lets you to create backup copies of most copy-protected software for archival purposes to protect expensive software.
58565 $23

PC-FullBak® by Westlake Data quickly backs up and restores files from your hard disk to protect your crucial data. Requires at least 128KB RAM, DOS 2.0.
58600 $49

Fastback by Fifth Generation makes backups to protect data stored on your hard disk. In four minutes, it formats diskettes and backs up a 10MB hard drive. Requires at least 128KB RAM and DOS 2.0.
58555 $92

Disk Optimizertm by SoftLogic Solutions safely reorganizes and compresses files to continuous sectors for reduced access time. Requires at least 128KB RAM and DOS 2.0.
58560 $39

SideKick® by Borland runs an editor, phone directory, autodialer, monthly calendar, appointment calendar, calculator, and ASCII table while simultaneously running other programs like *1-2-3* or *dBASE III*. Not copy protected. Requires at least 128KB RAM, MS-DOS 2.0, a disk drive, and a Hayes-compatible modem.
58585 $50

X-TREEtm by Executive Systems simplifies file and directory management. It structures, sorts, and organizes files. Not copy protected. Requires at least MS-DOS 2.0 and 192KB RAM.
58575 $35

PathMindertm by Westlake Data manages your computer's directories and files. Maintains a file security and systems log. Requires at least 256KB RAM and MS-DOS 2.0-3.
58598 $35

SafetyNettm by Westlake Data is a 4KB memory resident program that allows you to recover accidentally erased files. SafetyNet maintains deleted files' allocated file space permiting recovery of files long after they have been deleted.
58596 $44

Languages

Turbo Pascal® by Borland powers up your computer with the Pascal language. Includes full-screen interactive editor, fast separate compiler, and support for: 64KB+ programs, device-independent graphics, and macros. Minimum requirements for an integrated environment: 384KB RAM, for command line: 256KB RAM.
58201 $62

QuickBASIC by Microsoft speeds up the programming process by eliminating the lengthy compile step. Supports the 8087 and 80287 coprocessors. The full-screen windowing editor aids in debugging and provides context-sensitive help. Requires at least 320KB RAM and DOS 2.1.
58235 $61

Turbo BASIC® by Borland is a high-performance, high-speed BASIC program that includes an interactive editor, a trace debugging system, and a fast compiler. Requires at least MS-DOS 2.0.
58200 $57

Sensational Software! Sensational Selection!

Communication

Crosstalk XVI ® by MicroStuf is a complete communications software package. The extensive prompt system makes it extremely user friendly. Supports Crosstalk, XMODEM, X.PC, Send/Capture, and Kermit protocols. Requires at least 96KB RAM and a modem.
59000 $99

Smartcom II ® by Hayes simplifies telecomputing by storing the phone numbers, log-on sequences, and communication parameters. Supports Hayes Verification, Stop/Start, Send Lines, XMODEM, and XMODEM CRC protocols. Requires at least 196KB RAM and a modem.
59105 $85

CompuServe Subscription Kit offers easy access to electronic services and online databases by means of a local phone call or supplemental networks such as TYMNET
59110 $21

Games

Flight Simulator by Microsoft makes you the pilot of a Cessna 182. Learn to navigate airports under various weather and flight conditions. When you've earned your wings, try your skill against enemy fighters in World War I Ace. Requires at least 128KB RAM, gaphics adapter card. Joystick/mouse usage is optional.
61500 $35

Jet by SubLOGIC puts you in the cockpit of the technologically advanced F-16 Fighting Falcon or the F-18 Hornet.

Requires at least 128KB RAM and an EGA or color graphics card. Joystick usage is optional.
61510 $35

Scenery Disks enhance your *Jet* and *Flight Simulator* programs by increasing the variety and detail of the terrain. These disks supply visible landmarks for "sight" maneuvering. Requires at least Flight Simulator 2.0 or Jet 1.3.
61511 Dallas, Ft. Worth, Houston $16
61512 Los Angeles, San Francisco, Las Vegas $16
61513 Washington DC, Charlotte, Miami $16

Where in the World is Carmen Sandiego?™ by Broderbund whisks you off on an international adventure of mystery and intrigue as you try to determine the whereabouts of the infamous thief Carmen Sandiego and her gang. Requires at least a Hercules-compatible graphic adapter.
61520 $30

Where in the USA is Carmen Sandiego? by Broderbund has the daring criminal Carmen Sandiego loose again in this equally enthralling sequel. This time you scour the United States to follow the trail of Carmen and her gang of crooks. Requires a Hercules-compatible graphics adapter.
61521 $30

Sargon III® by Hayden Software is stimulating for the chess master and helpful for the novice. Sargon III allows you to take back moves, change sides, and study classic chess problems. It even suggests moves for you, visually displays the moves it considers, or monitors a game between you and an opponent for illegal moves. Requires at least 128KB RAM.
61528 $15

F-15 Strike Eagle® by MicroProse challenges your combat piloting ability with four skill levels. Navigate dangerous missions using the sophisticated instrument panel that includes Heads Up Display. Requires at least 128KB RAM, a CGA or EGA monitor, and that drive A is 5.25". Joystick usage is optional.
61527 $25

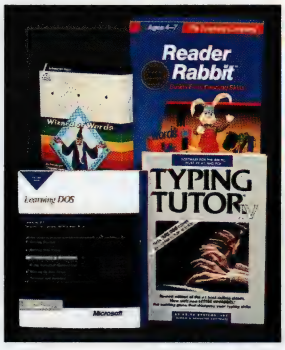
King's Quest III, the third installment of the popular Quest series by Sierra On-Line, is a graphics-adventure program with realistic 3-D animation. Advanced design includes parser, self-mapping features, and choreographed soundtrack. Requires at least 256KB RAM and MS-DOS.
61523 $30

NFL Challenge by XOR puts you on the gridiron, coaching your choice of the 28 NFL teams. Simulation introduces chance events like individual player characteristics, fumbles, interceptions, injuries, substitutions, and penalties. Animated coverage with instant replay possible on systems with RGB color monitors. Requires at least 256KB RAM, DOS 2.0, and monochrome or color adapter card.
61524 $59

Destroyer™ by Epyx puts you in command of a Fletcher Class US Naval Destroyer in this exciting graphics-action game. Seven progressively difficult scenerios add to the realistic simulation of piloting a WWII destroyer. Minimum requirement for PC-compatibles is a color monitor.
61522 $25

Education

Learning DOS by Microsoft is a comprehensive guide to understanding the IBM PC operating system. Teaches you file management, application, and batch file skills. Requires at least 256KB RAM and MS-DOS 2.0.
61000 $32



Typing Tutor IV® by Simon & Schuster customizes lessons to your abilities. Also includes an arcade-style game that entertains as it helps increase your typing speed. Requires at least 128KB RAM, MS-DOS 2.0 (PCjr requires DOS 2.1).
61020 $32

Reader Rabbit™ by The Learning Co. makes learning to read fun. Designed for ages 4-7, Reader Rabbit keeps your child's attention with four animated games that teach reading, spelling, vocabulary, and memory skills. Requires at least 256KB RAM, MS-DOS, a color graphics adapter. 3.5 diskette available for nominal fee with purchase of this package.
61035 $25

Alge-Blaster!™ by Davidson & Assoc. helps develop a strong foundation in algebra fundamentals. Factoring polynominals and systems of equations are easy to solve with the helpful prompts provided. New problems can be inserted into the program. Requires at least 128KB RAM, DOS 2.0, and color/graphics.
61030 $26

Math Blaster Plus!™ by Davidson & Assoc. teaches basic skills in math including: addition, subtraction, multiplication, division, fractions, decimals, and percentages. Five different learning activities, animation and color, "Blasternaut" math game, and award certificates add to the fun of learning. Requires at least 256KB RAM, DOS 2.0, and color/graphics.
61025 $29

Wizard of Words by Advanced Ideas increases children's reading, spelling, and vocabulary skills through five educational games. Tailor your child's learning of the resident 38,000 words or customize the lessons with your own vocabulary lists. Requires at least 128KB RAM and a color card. 3.5 diskette available for nominal fee with purchase of this package.
61045 $25

Books

61005 ***Running MS-DOS*** by Van Wolverton. *$16*

PRINTER STANDS

Organize printer paper with a durable printer stand to create more workspace.

Roll 'N' Fold stand for 80-column printer keeps paper neat and out of the way.
38755 $24

Roll 'N' Fold stand for 132-column printer.
38756 $30

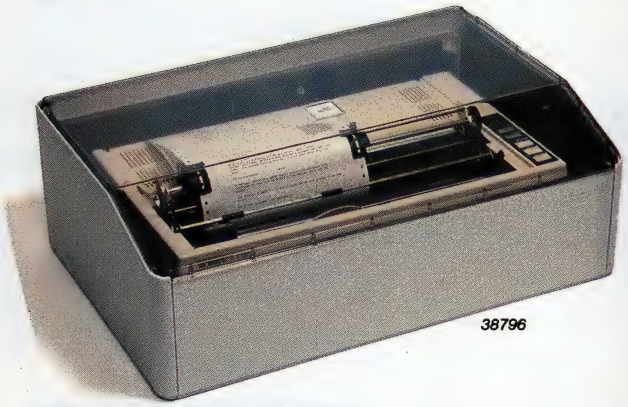
Universal printer stand is made of heavy duty plastic and holds any size printer (without tray).
38760 $6

Universal printer stand (with tray).
38761 $12

Multifunction printer stand for 80-column printer with under-printer drawer (plastic).
38765 $16.50

No Frills plastic stand for 80-column printer.
38748 $10

No Frills metal stand for 132-column printer.
38749 $24

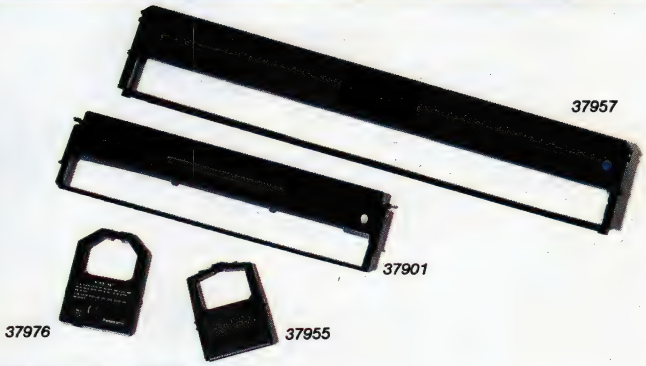


PRINTER MUFFLERS

Kensington® mufflers control noise making your printer a more pleasant co-worker.

Printer muffler for 80-column printer (19" x 16" x 6").
38795 $45

Printer muffler for 132-column printer (26" x 16.25" x 8.5").
38796 $59



PRINTER RIBBONS

37902	Epson FX-286e. *$6*	*37956*	Okidata 292e. *$10*
37901	Epson FX-86e/LX-800. *$6*	*37957*	Okidata 293e/294. *$13*
37930	Epson EX-800. *$12*	*37976*	Panasonic 1080i, 1091i, 1092i, 1592, 1595. *$12*
37915	Epson LQ-850. *$8*		
37916	Epson LQ-1050. *$10*	*38066*	Star NX-1000. *$6*
37955	Okidata 192/193. *$10*		

CONTINUOUS FORM COMPUTER PAPER

White, 9.5"x11", 250 sheets.
35010 $5

White, 9.5"x11", 1400 sheets.
35016 $11

White, 9.5"x11", 2500 sheets.
35020 $19

Green bar,15"x11", 650 sheets.
35035 $11.50

Green bar, 15"x11", 2500 sheets.
35036 $25

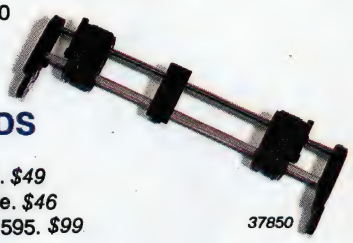
Pastel, 9.5"x11" (50 ea. pink, ivory, canary, blue).
35025 $7.50

Bright, 9.5"x11" (50 ea. red, yellow, green, blue).
35026 $7.50

Mailing labels, 5000 (1 across, 1"x3").
35610 $12

TRACTOR FEEDS

37850 For Okidata 192. *$49*
37851 For Okidata 292e. *$46*
37875 For Panasonic 1595. *$99*



DOT-MATRIX PRINTERS

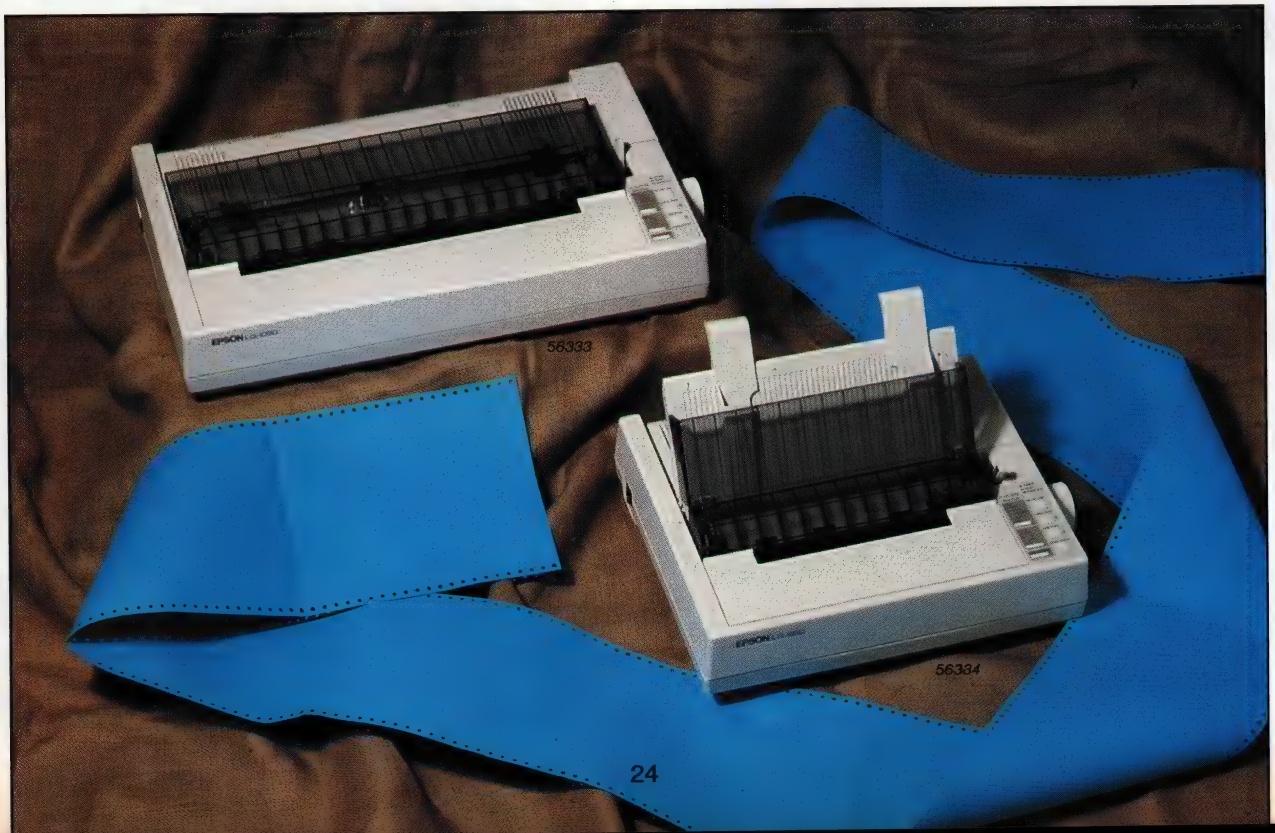
EPSON®

Model LX-800 provides the quality and software compatibility you expect from Epson plus draft (180cps) or near letter quality printing (30cps), multiple type styles, Epson Character Graphics set, and dot-graphics capability. Parallel interface. (80 columns).
56301 *$234*

The FX series dot-matrix printers have been industry standards for many years. These new additions are built with meticulous attention to detail to ensure performance durability. Printing 240cps in draft mode and 48cps in near letter quality mode, these printers can boost your printing output quickly and efficiently. Parallel interface.
56310 Model FX-86e (80 columns). *$399*
56311 Model FX-286e (132 columns). *$579*

The EX-800 dot-matrix printer is ideal when you have a large volume of printing to be done. It prints 300cps in draft mode and 60cps in near letter quality mode. A choice of type styles customizes your print jobs. Parallel/serial interface. (80 columns).
56320 *$499*

The LQ series features a 24-pin print head that produces letter quality printing on a dot-matrix printer. An economical machine that creates good-looking printed material. The LQ-500 printer prints 180cps in draft mode and 60cps in letter quality mode. Includes an 8KB buffer and a Centronics-compatible, 8-bit parallel interface (the RS-232 interface is optional). The LQ-850 and LQ-1050 printers print 264cps in draft mode and 88cps in letter quality mode. Each includes a 6KB buffer and serial and parallel interfaces.
56335 Model LQ-500 (80 columns). *$389*
56334 Model LQ-850 (80 columns). *$619*
56333 Model LQ-1050 (132 columns). *$859*



OKIDATA®

The 190 series maintains the sleek space-saving profile that made this series popular. Added speed, paper handling, and compatibility features make the 190 Plus printers the easiest to use in their class. Prints up to 200cps in draft mode and 40cps in near letter quality mode. Parallel interface.
192 Plus (80 columns).
56350 *$329*
193 Plus (132 columns).
56351 *$539*

The Microline® 292/293 series of printers offer high-quality dot-matrix printing with enhanced graphics capability. IBM compatible, these printers reproduce graphics, spreadsheets, and text files using a dual 9-pin printhead and a special Lotus® -compatible driver. They print 240cps in draft mode and 100cps in near letter quality mode. Parallel interface kit included.
292e Microline (80 columns).
56356 *$459*
293e Microline (132 columns).
56357 *$599*

The wide-carriage Microline 294 is faster and more versatile than many other comparably priced printers. Printing in utility mode at 400cps and near letter quality at 100cps, this printer is ideal for time-dependent applications. Handling sheets up to 16" wide, it connects by a parallel port. (132 columns).
56358 *$849*

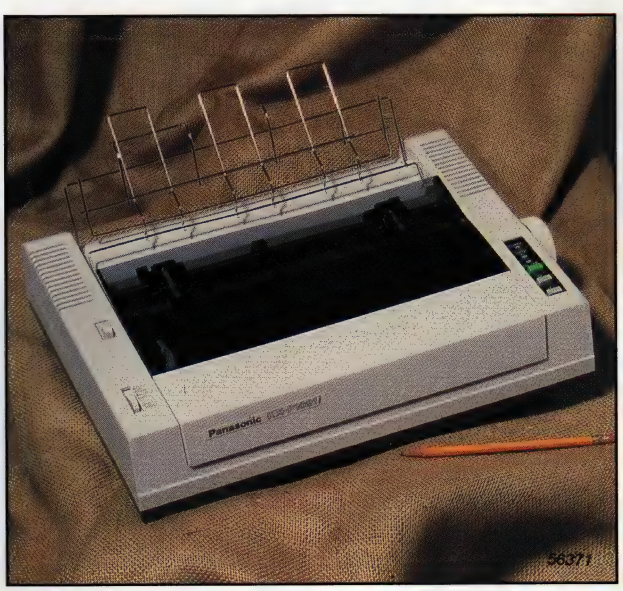
PANASONIC®

Model 1080i is a 10" printer operating at 120cps in draft mode and 24cps in near letter quality mode. Proportional spacing, print mode selector, and high-resolution graphics make this an all-around printer for everyday office needs. Parallel interface. (80 columns).
56370 *$179*

Model 1091i prints at 160cps in draft mode and 32cps in near letter quality. This 10" printer , offers all the features of the 1080i with increased speed. Parallel interface. (80 columns).
56371 *$199*

PC MAGAZINE Editor's Choice Nov. 10, 1987

Model 1092i prints at 240cps in draft mode and 48cps in near letter quality mode. Proportional spacing, high-resolution, dot-addressable graphics, and downloadable characters make this printer ideal for any business use. Parallel interface. (80 columns).
56372 *$349*



Model 1592 is a high performance printer that prints at 180cps in draft mode and 38cps in near letter quality mode. Parallel interface. (132 columns).
56373 *$449*

Model 1595 prints at 240cps in draft mode and 51cps in near letter quality mode to quickly meet all your printing demands. Parallel and serial interface. (132 columns).
56374 *$479*

39401 40002

ELECTRONIC SUPPLIES

TESTERS

Mini-Tester (M-F) tests for faulty RS-232 interfaces.
40002 *$7*

Mini-Wiring (DB25M-DB25F) permits custom configuration of the RS-232 interface.
40006 *$15*

Quick Tester RS-232 M/F has 18 LEDs to check EIA interface problems.
40007 *$14*

Loopback Tester RS-232 M/F has four LEDs to monitor leads.
40008 *$9*

Reverser RS-232 tests for the common problem of reversed transmit and receive data pins.
40050 *$6*

JUMPER BOXES

Jumper boxes custom design in-line adapters for non-standard ports.

40000 Male to female. *$4*
40001 Male to male. *$4*
39999 Female to female. *$7*

CONVERTERS

For communication between different interfaces, use a converter.

39402 DB9F to DB25M. *$7*
39401 Parallel to serial. *$39*
39400 Serial to parallel. *$39*

GENDER CHANGERS

Gender changers permit connections between cables with same type of connector ends.

40015 Male to male (DB9). *$4*
40016 Female to female (DB9). *$4*
40020 Male to male (DB25). *$4*
40021 Female to female (DB25). *$4*
40025 Male to male (C36). *$8*
40026 Female to female (C36). *$8*

LINE BOOSTERS

40035

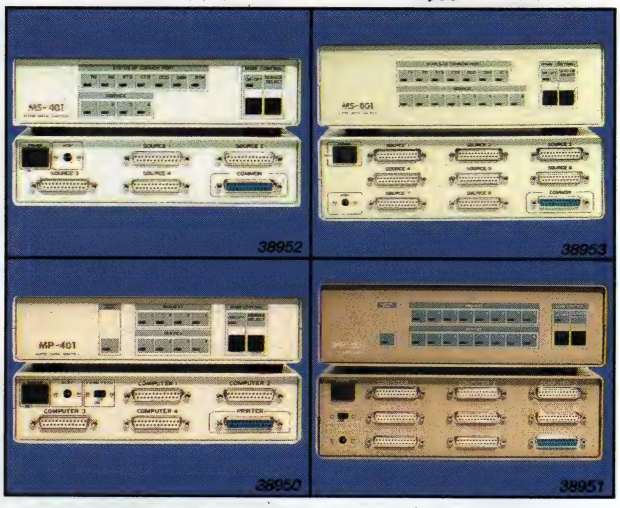
Amplify transmission signals to the receiver with a line booster.

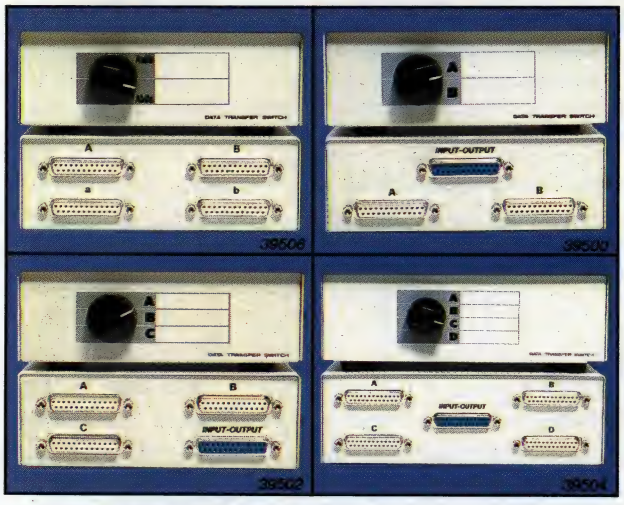
39425 Centronics booster. *$39*
39426 RS-232 booster. *$39*

NULL MODEMS

Null modems are used for in-line connection of like devices.

40035 Male to male. *$5*
40036 Male to female. *$5*
40037 Female to female. *$5*





AUTOMATIC SWITCH BOXES

These are ideal for offices where multiple users share peripherals. These devices automatically queue print jobs. Available with DB25F connectors. Numbers in parentheses reflect computers/peripheral.

38952 Serial auto switch box (4 /1). *$65*
38953 Serial auto switch box (8 /1). *$89*
38950 Parallel auto switch box (4 /1). *$65*
38951 Parallel auto switch box (8 /1). *$89*

MANUAL SWITCH BOXES

Multiple users can share peripherals or a single user can use many peripherals with the flip of a switch. Numbers in parentheses reflect computers/peripherals.

25-Pin (serial or parallel):

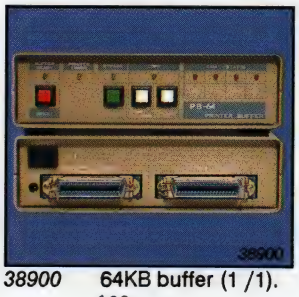
39506 X switch box (2/2). *$19*
39500 AB switch box (2/1). *$15*
39502 ABC switch box (3/1). *$19*
39504 ABCD switch box (4/1). *$23*

36-Pin (Centronics, not pictured):

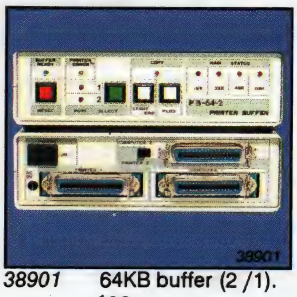
39507 X switch box (2/2). *$19*
39501 AB switch box (2/1). *$15*
39503 ABC switch box (3/1). *$17*
39505 ABCD switch box (4/1). *$19*

BUFFERS

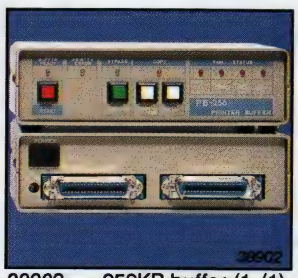
Increase productivity by printing and computing at the same time. All buffers connect with Centronics parallel interfaces. Numbers in parentheses indicate computer/peripheral.



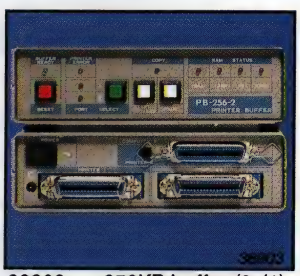
38900 64KB buffer (1 /1). *$63*



38901 64KB buffer (2 /1). *$86*



38902 256KB buffer (1 /1). *$135*



38903 256KB buffer (2 /1). *$149*

SURGE SUPPRESSORS

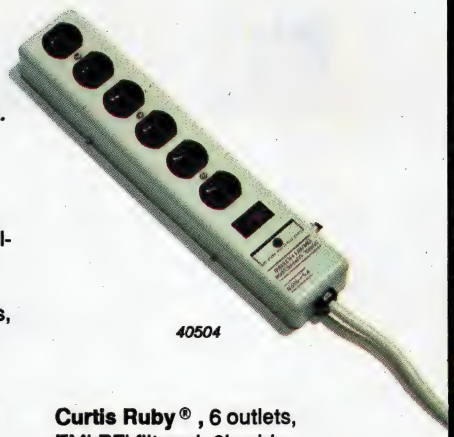
Sudden surges of power can cause serious damage to your computer and erase valuable data. These accessories protect your system from surges of voltage and current.

40527

RS-232 (M-F) surge protector for serial ports.
40005 $5
Curtis® Safe Strip, 6 outlets (two switched), 7' cable.
40525 $17

4-outlet basic power strip.
40500 $8
6-outlet basic power strip.
40501 $9
6-outlet basic surge protector with circuit breaker.
40502 $12
6-outlet full surge protector with surge indicator light.
40503 $15
6-outlet full surge protector with light and noise filter.
40504 $16
4-outlet full protector with light and noise filter and EMI-RFI filtration.
40506 $14

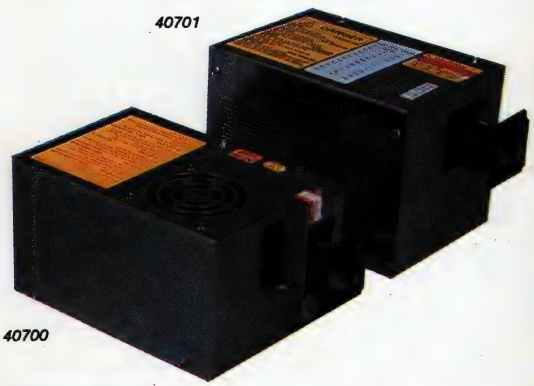
6-outlet full protector with light and noise filter and EMI-RFI filtration.
40505 $19
Curtis Diamond®, 6 outlets, switched, lifetime warranty.
40527 $28
Curtis Diamond Plus®, includes modem protection.
40528 $39
Curtis Emerald®, 6 outlets, 6' cable, built-in circuit breaker, warranty.
40529 $33



40504

Curtis Ruby®, 6 outlets, EMI-RFI filtered, 6' cable, circuit breaker, warranty.
40530 $45
Curtis Ruby Plus®, includes modem protection.
40531 $55

40701



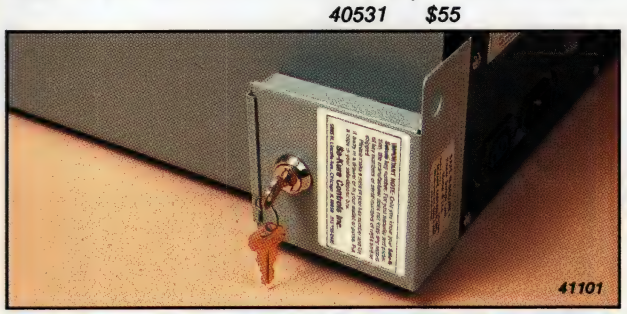
40700

POWER SUPPLIES

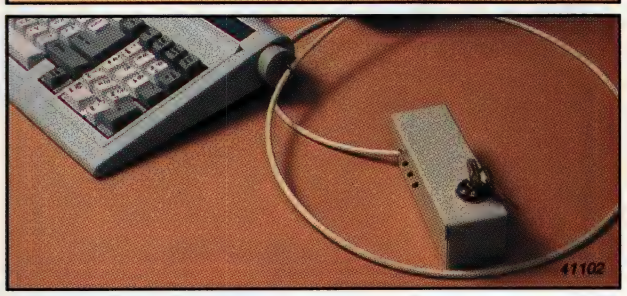
Increase output with a new, effective power supply.

150-watt replacement power supply for PC/XT.
40700 $69

200-watt replacement power supply for the AT.
40701 $119
200-watt replacement power supply for the mini AT.
86011 $79



41101



41102

SECURITY

Secure valuable equipment with these tamper-resistant steel devices.

SE-KURE cylinder screw guard system for protection against equipment theft.
41101 $59

SE-KURE power-switch lock with keys ensures security for disk drives.
41100 $36

SE-KURE steel plug and cable system protects four of your most valuable peripherals with easily installed plugs.
41102 $49

COVERS

Protect your computer when it is not in use with these attractive and handy covers.

41775

41726

Dust cover for PC/XT. Clear plastic.
41775 $6
Dust cover for AT. Clear plastic.
41776 $6

Keyboard cover for PC/XT, or AT. Rigid smoked plastic.
41725 $5
Keyboard cover for 5151 or enhanced 101-key keyboard. Rigid smoked plastic
41726 $5

41695

41696

Disk drive cover for PC/XT. Black rigid plastic.
41695 $4
Disk drive cover for AT. Tan rigid plastic.
41696 $4

CALCULATORS

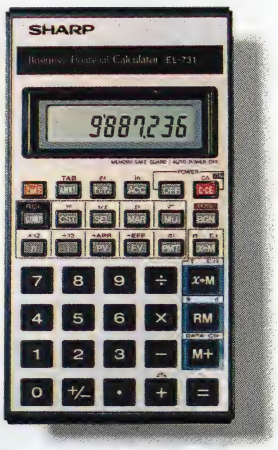
ADD UP YOUR SAVINGS WITH HEWLETT-PACKARD® AND SHARP® CALCULATORS FROM COMPUADD

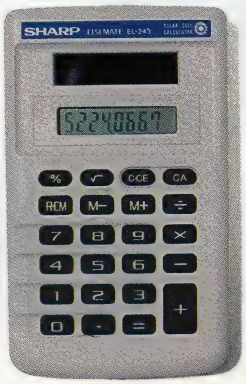
HEWLETT PACKARD

Hewlett-Packard Financial Calculator (HP-12C) solves your everyday business calculations, including simple and compound interest, present and future values, amortization, depreciation. Includes five financial registers. The HP-12C has 99 lines of program memory, it executes unconditional branching statements, 2-conditional tests, and automatic memory allocation. Features 10-digit LCD display, continuous memory, automatic power off, diagnostic self-check without program loss, RPN logic system with automatic four memory stack, error recovery, stack manipulations, and 20 registers.
52050 *$69.95*

Hewlett-Packard Scientific Calculator (HP-28S) is equipped with 32KB RAM; graphics; HP Solve; symbolic algebra; symbolic calculus; binary conversions; high-level, structured programming; list-based statistics; enhanced RPN with algebraic input; and matrix/vector arithmetic. Features four lines by 23-character display, continuous calculator memory, soft keys, menu labels, separate number and letter keyboards, and an infrared printer interface.
52052 *$189*

Sharp Financial Calculator (EL-731) easily handles your business calculations including interest, margin, mark-up, bond yield, amortization, annual/effective rate conversion, and percent/delta percent functions. The statistical mode has mean, summation, and standard deviation. Features 8-digit display with decimal selection, Memory Safe Guard, and Auto Power Off.
52011 *$17.99*

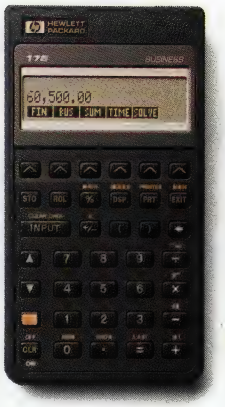


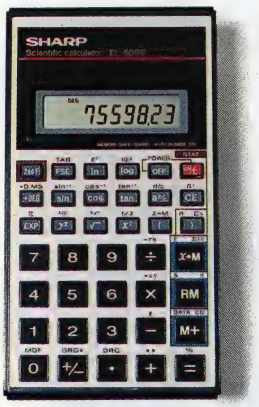


Sharp Solar Calculator (EL-243) performs the basic arithmetic functions. Features 8-digit LCD solar-powered (80 lux) display, enlarged add key, 3-key memory, one-touch percent key, and square root key.
52005 *$4.99*

Special Value!

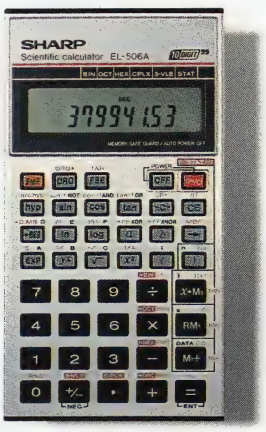
Hewlett-Packard Business Calculator (HP-17B) handles custom formulas without programming. Performs business and finance functions such as amortization, depreciation, bonds, interest rate conversions, and list-based one- and two-variable statistics and forecasting. Features continuous calculator memory, 2-line alphanumeric display, and soft keys.
52051 *$95.95*





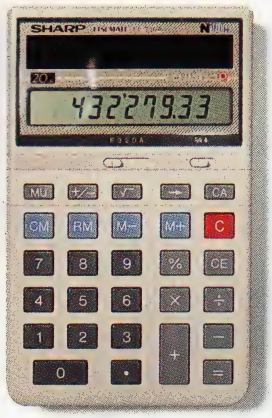
Sharp Scientific Calculator (EL-509S) is preprogrammed with 56 scientific and statistical functions including fraction calculations; degree conversions; 3-angle modes; rectangular/polar coordinate conversions; modifying functions; and fixed decimal, scientific, and engineering notation. It features 15-level nested parentheses capability and constant, power, reciprocal, and chain calculations. Large keys, easy-to-read 8-digit LCD display, four-key memory, Memory Safe Guard™, and Auto Power Off™ make this the perfect wallet-sized calculator for the college student.
52010 *$13.99*

Sharp Two-Memory Scientific Calculator (EL-506A) has a 10-digit display and is preprogrammed with 93 scientific and statistical functions including three-variable linear equations; logical operations; fixed decimal, scientific, and engineering notation; and display format exchange. It features complex number calculations; Hex, octal, and binary calculations; probability calculations with normal distribution random variable; 15-level nested parentheses capability; constant, power, reciprocal, and chain calculations; 3-key memory x 2 with Memory Safe Guard; and Auto Power Off.
52009 *$17.99*



Sharp Solar Calculator (EL-376A) handles constant, power, reciprocal, and chain operations. Features 8-digit LCD solar-powered (50+ lux) display, enlarged add key, 3-key memory, one-touch percent key, and square root key.
52008 *$6.99*

Special Value!



Sharp Solar Semi-Desktop Calculator (EL-336A) readily tackles constant, power, reciprocal, and chain calculations. Features 10-digit LCD solar-powered (20+ lux) display, enlarged add and zero keys, 5-position decimal selector, 4-key memory, one-touch percent key, square root key, mark-up and mark-down functions, backspace key, and fold-out stand for desktop use.
52007 $21.99

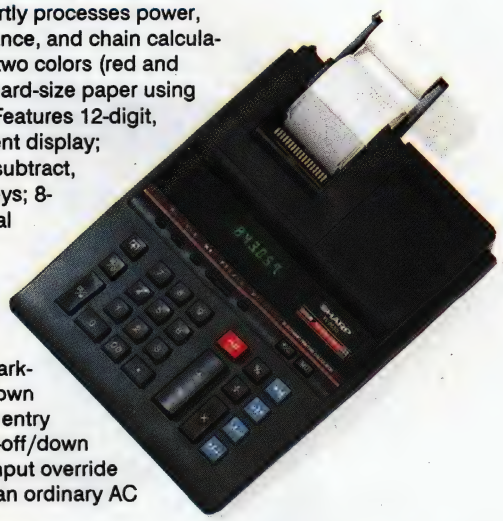
Sharp Semi-desktop Calculator (EL-1601T) computes power, reciprocal, balance, and chain calculations. Features 10-digit green fluorescent display, 4-position decimal selector, 3-key memory; print/non-print modes, one-touch percent key, and item count key. Uses 4 AA batteries and standard-size paper. Batteries not included.
52002 $34.99

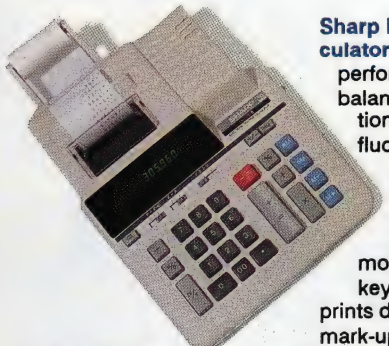
Sharp Printer Calculator (EL-1611S) a hand-held printer with desktop features that performs your daily calculations including constant, power, reciprocal, and chain calculations. Features 10-digit LCD display; decimal point selector, 3-key memory, print/non-print modes, swing-out paper holder, and Auto Power Off. Uses 3 AA batteries and standard-size paper. Batteries not included.
52003 $24.99

Sharp Desktop Calculator (EL-1192D) crunches numbers like a pro! Performs power, reciprocal, balance, and chain calculations. Includes such handy features as a 10-digit, green fluorescent display; enlarged add, subtract, and multiply keys; 5-position decimal selector; 4-key memory; print/non-print modes; one-touch percent key; and non-add/sub-total key. AC adapter included. Uses standard-size paper.
52000 $45.99

Sharp Deluxe Desktop Calculator (EL-2197II) whizzes through power, reciprocal, balance, and chain calculations. Features 12-digit green fluorescent display; enlarged add, subtract, and multiply keys; 8-position decimal selector; 4-key memory; print/non-print modes; one-touch percent key; sub-total key that also prints dates, code numbers, etc.; mark-up and mark-down functions; item entry counter; backspace key; and round-off/down function. Powered by an ordinary AC outlet. Uses standard-size paper.
52004 $69.99

Sharp Deluxe Desktop Calculator (EL-2630) expertly processes power, reciprocal, balance, and chain calculations. Prints in two colors (red and black) on standard-size paper using an ink ribbon. Features 12-digit, green fluorescent display; enlarged add, subtract, and multiply keys; 8-position decimal selector; 4-key memory; print/non-print modes; one-touch percent key; mark-up and mark-down functions; item entry counter; round-off/down function; and input override decimal. Uses an ordinary AC outlet.
52006 $89.99





Sharp Deluxe Desktop Calculator (EL-1197III) speedily performs power, reciprocal, balance, and chain calculations. Features 10-digit, green fluorescent display; enlarged add, subtract, and multiply keys; 6-position decimal selector; 4-key memory; print/non-print modes; one-touch percent key; sub-total-key that also prints dates, code numbers, etc.; mark-up and mark-down functions; item entry counter; and backspace key. Powered by an ordinary AC outlet. Uses standard-size paper.
52001 $59.99

SHARP®
FROM SHARP MINDS COME SHARP PRODUCTS™

PHOTOCOPIERS

Canon® PC25 Personal Copier is a versatile copier with 67% and 78% reduction and 120% enlargement capability. Produces quality reproductions from business card size originals to legal size originals. Prints 1-19 multiple copies and includes an automatic letter-size paper cassette tray with a 100-sheet paper volume. Weighs 72.43 lbs. and measures 11.5" x 18.88" x 19.38". Includes 90-day warranty at any authorized Canon service site. Requires toner cartridge. Shipped via UPS in two cartons.
56152 $999

56152

56151

Canon PC5 Personal Desktop Copier eliminates having to feed single sheets of paper with its multiple stack feeding feature for up to 50 sheets. Copies sheets, books, and 3-D objects from bus-iness card size to letter size using a heat-roller fixing system.This copier has a 1-9 multiple copies capability, a 1:1 reproduction ratio, and a warm-up time of 18 seconds. Weighs 28 lbs. and measures 5.4" x 14.4" x 16.4". Includes 90-day warranty at any authorized Canon service site. Requires toner cartridge.
56151 $599

Canon PC3 Personal Portable Copier travels with you to copy sheets, books, and 3-D objects from business card size to letter size using a heat-roller fixing system. This copier has single-sheet bypass, a 1:1 reproduction ratio, and a warm-up time of 18 seconds. Weighs 26 lbs. and measures 5.4" x 14.4" x 16.4". Includes 90-day warranty at any authorized Canon service site. Requires toner cartridge.
56150 $499

56150

38353

TONER CARTRIDGES

PC3/PC5 black ink toner cartridge for the PC3 and PC5 copiers.
38354 $69

PC25 black ink toner cartridge for the PC25 copier.
38353 $69

TEAK OFFICE ACCESSORIES

Personalize your office in style with these handsome accessories. Crafted in teak wood, these accessories will complement any executive office.

41600

41611

TEAK DISK FILES

For 45, 3.5" diskettes, with four teak wood dividers.
41600 $15

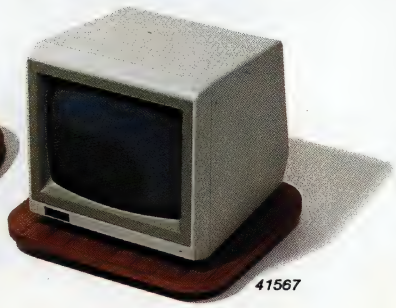
For 50, 5.25" diskettes, with four teak wood dividers.
41611 $20

TEAK SWIVEL BASES

Teak turntable system stand is the attractive answer for those who share personal computer systems. The swivel base easily swings the computer to face different users.
41557 $46

Teak turntable monitor base positions your monitor for flexible viewing, while creating more room on your desktop.
41567 $27

41557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Collect your thoughts with a microcassette recorder.

52500

Panasonic® microcassette recorder (RN-15), sleekly styled, this voice-activated recorder measures a mere 3/4" in depth. Features fast playback, one-step recording, two tape speed selections, silent full auto-stop, lockable pause, edit function, AC adapter, and earphones. Measures 4.625" x 2.3125" x .75".
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52501

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52601 $119.95

52601

52600

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52652

52653

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52602

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56051

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56050 $1049

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56052 $1499

56052

56050

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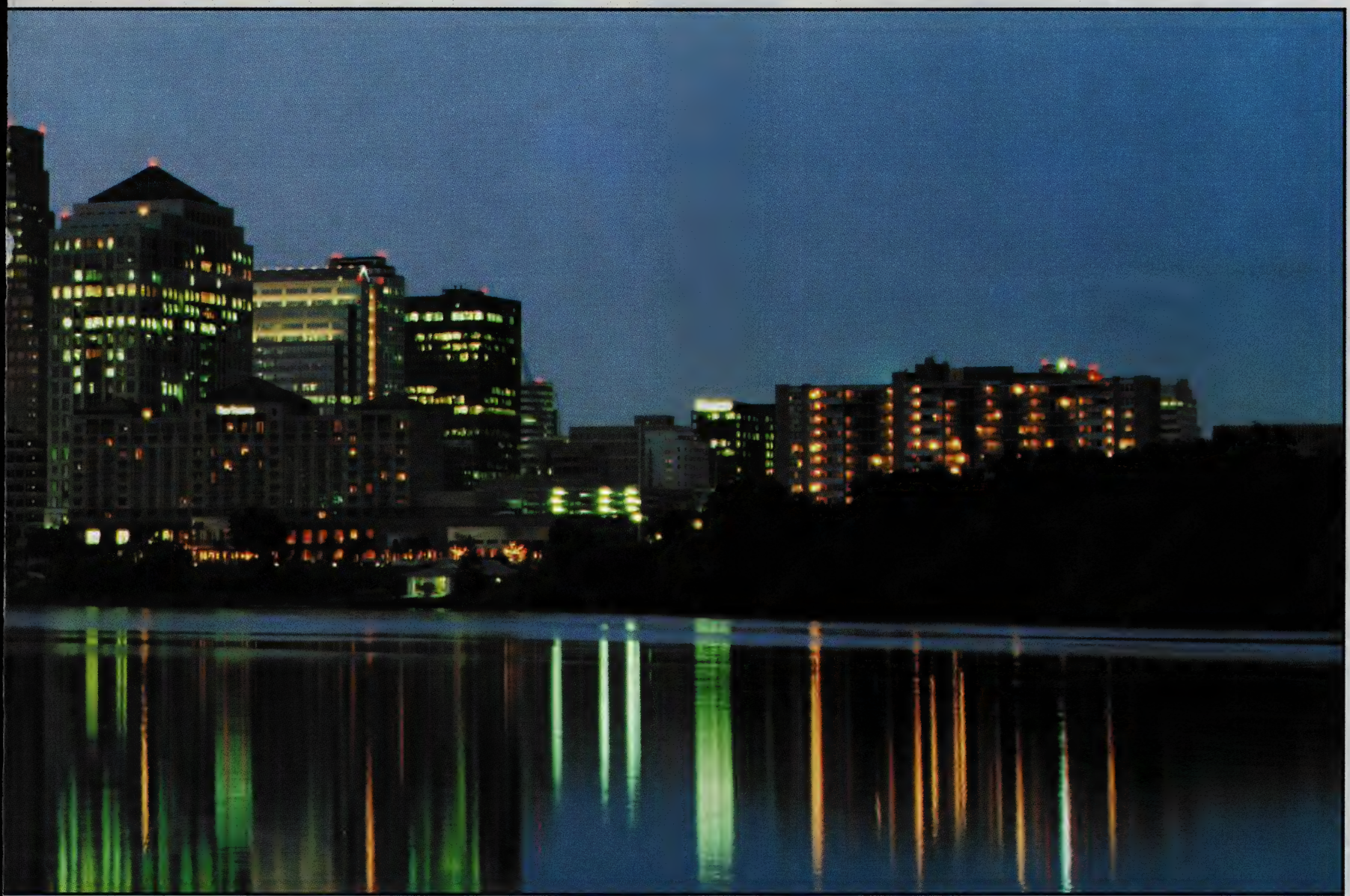

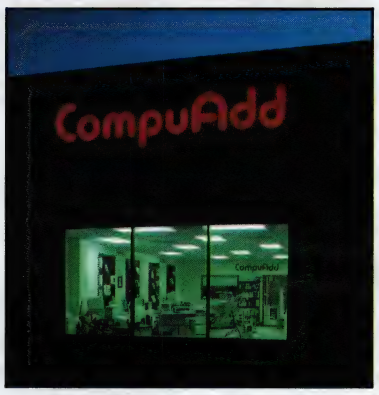

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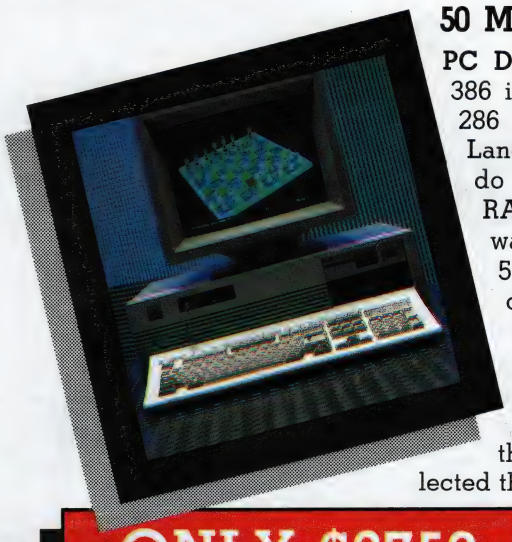

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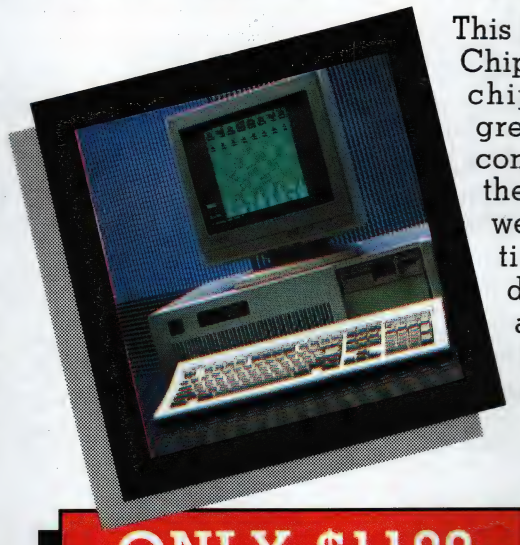

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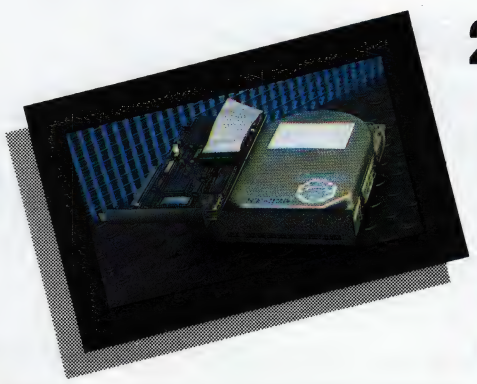

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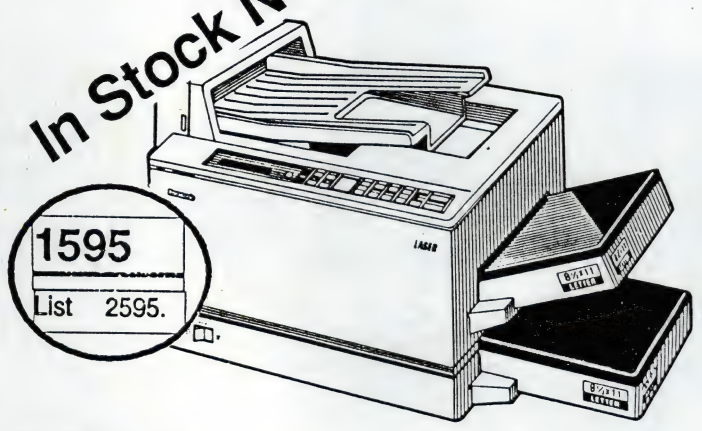

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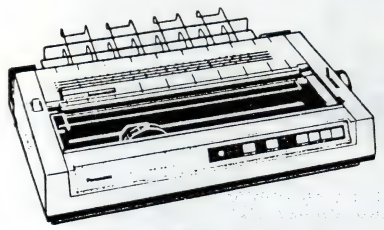

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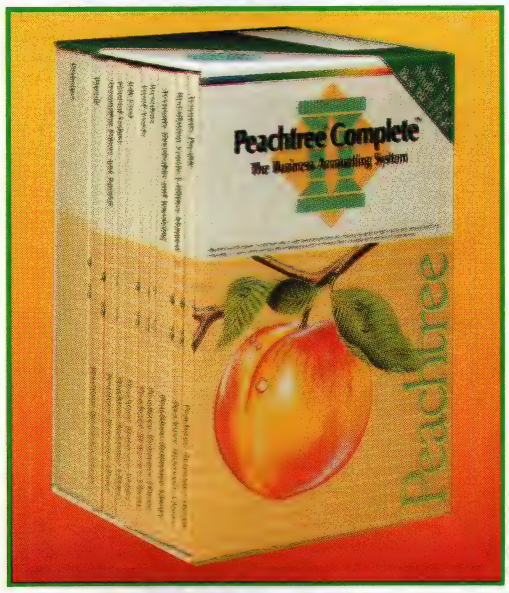

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PR3003 36 Pin to 36 Pin Printer Cbl — $ 9

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PR2001 Citizen 120D Printer 120CPS — $173

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AC2002 AC Surge Power Pad Monitor Stand — $ 25

AC2003 AC 300 Watt UPS, Uninterruptible Power Supply — $259

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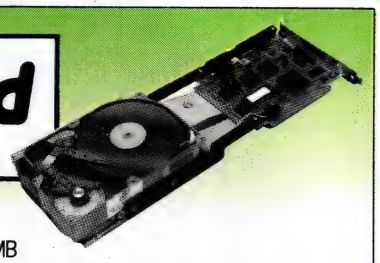

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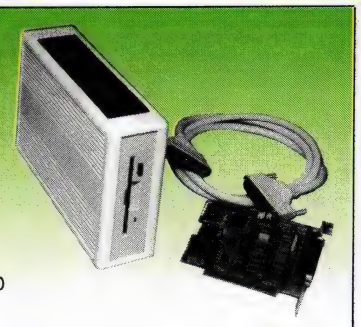

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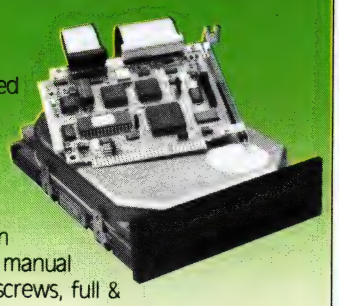

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FH	Micropolis 1335	28ms	71MB	$749
FH	Maxtor 1140	27ms	117MB	$1669

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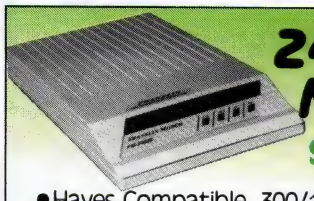

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Hard only/12Mhz up AT's, 1.1 Interleave 1006-WAH	$179

Conference continued from page 54

would make the information more valuable to the customer. In addition, there was the belief that CD-ROM would enable HP to update support documentation with greater speed. Considering that one change to an operating system can affect more than 20 manuals, this benefit should not be minimized.

These perceptions were confirmed through a prototype CD-ROM containing technical support documentation. Customers who tested this prototype disk communicated the following benefits: increased productivity by quickly retrieving information as opposed to searching through paper documents; CD-ROM monthly updates are more convenient than inserting paper pages into a binder; a disk takes up a fraction of the space required by its equivalent in paper form.

The prototype disk served as a springboard for what has become known as HP LaserROM. It should be noted that Hewlett-Packard provides the LaserROM service to complement paper documentation, not replace it. While the HP LaserROM service might eventually reduce the amount of paper documentation distributed, this will not be known until the technology has been used by customers for an extended period of time.

Today, the HP LaserROM service supports the HP 3000 business computers, including the commercial RISC-based Precision Architecture computers. With more than 26,000 in use throughout the world, the HP 3000 is the second most widely-installed general purpose business computer. From a corporate perspective, HP LaserROM is comprised of approximately 15 percent of the company's total customer support documentation. HP intends to add several new CD-ROM-based information services to the HP LaserROM family over the next year.

By subscribing to the new service—regular mailings of updated CD-ROM disks—HP customers will be able to access up-to-date reference manual information, application notes, solutions to known problems and information about HP products and services.

HP believes it is the first company in the computer industry to provide a CD-ROM-based support-information service. Initial product offerings in the HP LaserROM family are only for users of HP 3000 business computers including the new commercial RISC-based HP Precision Architecture computers.

"We plan to add up to 10 new information services to the HP LaserROM family during the next year," said Lane B. Nonnenberg, marketing manager of HP's Applications Support Division.

The new service is targeted for MIS professionals and managers in system support and software development. CD technology now allows HP to store vast amounts of text and graphics on one HP LaserROM disk. Each disk can hold about 600 Mbytes, the equivalent of 200,000 pages, 1,500 floppy disks or a stack of product manuals 25 feet high.

The disk is read by a compact disk drive that is an internal peripheral to the HP Vectra PC or IBM PC/AT. This drive occupies the space of one floppy-drive slot, leaving the other available for general PC use. Because HP LaserROM makes use of a PC, access to HP technical information is not dependent on main computer system availability.

The user interface is simplified by the use of a run-time version of MS-Windows, which comes with HP LaserROM at no extra charge.

Each significant word on the disk is indexed. HP LaserROM's file-management system uses the index to locate specific information across multiple databases in a matter of seconds. Customers now can spend time using information rather than looking for it.

HP LaserROM file searches can be done in three ways: browse searching allows customers to find information by going from a general table of contents to specific sections of interest; in keyword searching, the customer specifies the information to be located by selecting words, phrases, topics of interest, words in proximity to one another or words to be used in Boolean search strings—a built-in thesaurus, when activated, also can assist in locating information; and HP LaserROM also allows customers to search with wildcards.

Regular mailings of updated disks will be made so customers will have the most current information. The new service is based on an annual subscription that includes databases and retrieval software. Each HP LaserROM disk contains a cumulative, up-to-date set of support information.

HP LaserROM may be purchased annually for $2700 per subscription. The subscription service also can be ordered with a starter kit that contains a half-height internal compact disk drive that customers can install in their HP Vectra PC or IBM PC/AT.

Reference Technology Announces CD-ROM Services

Reference Technology, a leading CD-ROM service company, has announced a complete set of services to assist organizations in publishing and distributing information on CD-ROM. Called the Information Distribution for Electronic Access (IDEA) Service Package, it includes the necessary capabilities to implement a wide variety of CD-ROM applications.

The IDEA service package consists of services that Reference Technology can perform for customers in its data center in Boulder, Colorado as well as capabilities that can be licensed from Reference Technology for in-house data preparation at the customer's own facility. The IDEA service package includes four specific services:

IDEA 1—Reference Technology has added to its previous services the data preparation capabilities to produce applications that utilize the research software being developed by West Publishing Company and Wang Laboratories. Reference Technology is the exclusive United States service bureau providing complete data capture, data conversion, indexing, formatting, and mastering of CD-ROM disks using the West/Wang format.

Philips-designed cartridge is supported by LMS.

IDEA 2—Reference Technology's established data preparation services are now available to be licensed to customers who desire to perform any of the steps of data conversion, indexing, and High Sierra/ISO 9660 formatting inhouse. These data preparation steps run on DEC VAX and MicroVAX systems.

IDEA 3—Reference Technology has an agreement to become the exclusive United States distributor of the Elektroson CD Simulator system for providing CD-ROM High Sierra/ISO 9660 formatting and application simulation on a personal computer workstation. Reference Technology can now support customers who need to simulate and format CD-ROM applications in their own facility using a PC-based processor.

IDEA 4—Reference Technology offers a complete preparation and delivery system for electronic forms generation and distribution using CD-ROM. By adding an image scanner and Reference Technology's form creation and indexing software to the CD Simulator system, customers can capture, index, and format forms electronically. With Reference Technology's forms fill-in software and a laser printer on an IBM PC or compatible, forms can be distributed on CD-ROM and then retrieved, filled-in, and printed out.

With this series of IDEAs, organizations publishing information on CD-ROM have a wide range of alternatives to meet their specific requirements. They can have Reference Technology provide data preparation services, license VAX-based data preparation software for inhouse usage, obtain a PC-based CD Simulator system, and utilize a complete PC-based system for electronic forms applications.

Reference Technology provides the services to put information on CD-ROM disks, the software and hardware to access the information, and the project management expertise to assist customers in successfully implementing CD-ROM applications.

Geovision And Tandy Announce Marketing Agreement

Geovision Inc., a software and CD-ROM database developer in Norcross, GA, announced that it has signed an agreement with the Radio Shack division of Tandy Corporation, whereby Radio Shack will include Geovision products in its Express Order Software program.

"This is Radio Shack's first listing of CD-ROM products for the Express Order Program," according to Howard Elias, senior director, Computer Merchandising for Radio Shack. Listings include several CD-ROM titles and CD-ROM player hardware (from Hitachi). The Express Order program provides a single source for a large variety of software titles through Radio Shack's nationwide retail outlets.

Included in the agreement is the Geovision GEOdisc U.S. Atlas geographic database and the companion Windows/On the World application software. The Geovision System allows the user to access, display, and manipulate the vast amount of geographical data contained in the CD-ROM database. All of the data is separated into layers (i.e., state and county boundaries, highways, waterways, railroads, etc.). The database also contains latitude and longitude data which allows for accurate location and positioning of any of over 1,000,000 entities in the database.

Ed Hanley, Geovision's director of sales says, "There is an incredible demand for a cost-effective approach to the problems in dealing with large geographic databases. The Geovision system satisfies this need with its PC-based CD-ROM approach to desktop

continued on page 74

Zenith
continued from page 22

curved CRT tube. Both monitors are analog RGB input with multi-synching capability.

Disk Storage Systems

Another area where Zenith didn't scrimp on the Z-286 is in the disk systems. Like the PS/2 line, the machine is designed with 3.5 inch drives in mind. The floppy drive is a 1.44 Meg version, with built-in autosensing for lower capacity disks (720K). It reliably read all the low density disks we fed it during the course of our evalution, but really needed HD (high density) disks when using the 1.44 Meg format.

The standard hard disk is a 40 Meg 3.5 inch Winchester with fast 28 ms. average access time. As Table 1 shows, it's a very good performer and comparable to the best 5.25 inch drives on the market. The 3.5 inch 40 Meg drive is not only fast, but it's unbelievably quiet, and quite a pleasant change after working with older hard disks that constantly whine.

Enclosure and Power Supply

The Z-286 enclosure is compact, less than four inches high and about 1.5 feet square. Zenith states that the machine was designed to take as little deskspace as possible, and that its footprint is smaller than most monitors. Under the 1390 monitor, the system enclosure is quite diminuitive. The monitor and keyboard will take up much more room than the enclosure, a far cry from the behemothic enclosures of earlier AT style machines.

The round-barrel key lock, another leftover from the AT, has been moved to the back of the machine. It's now a more reasonable physical security feature, which keeps the enclosure top from being removed, but stills allows the system to operate when locked. There is also a steel security loop built into the enclosure's back, so it can the unit can be more fully secured, a big requirement in educational and governmental computing environments.

The system power supply is an 80 watt switcher, which automatically adjusts for proper voltage (110-220) and frequency (50-60Hz). While 80 watts may seem a little light in power, especially when 150 or 200 watt supplies are found in most AT compatibles, the highly integrated motherboard circuitry, and 3.5 inch drives, draw much less power. So the power supply still provides more than adequate power to the expansion slots for any peripheral boards your likely to install.

Keyboard and "Bells and Whistles"

Zenith has their own version of the 101-key Enhanced keyboard for the Z-286. It replaces the older AT/Selectric-style keyboards used on the Z-240/248 (a key layout which Zenith actually offered before IBM did). As a long time fan of older Zenith keyboards, we still aren't comfortable with the Enchanced 101-key layout in general. But we did like the tactile feel of the new Zenith keyboard.

Zenith is also famous for its little "bells and whistles" found on their earlier PC and AT compatibles. There are some on the Z-286, too. For example, all on-board expansion RAM can be automatically allocated as EMS (expanded memory specification) memory. No special software drivers are needed, the EMS is handled in hardware. This immediately breaks the 640K DOS memory limit, using software written for EMS.

The Zenith PC's have always included a ROM-based debugger utility, very similar to DEBUG.COM, called the "Zenith MFM" monitor. It's also present on the Z-286, and is most helpful in diagnosing problems, or running tests on defective equipment. The ROM debugger menu also includes a CMOS memory SETUP utility, which allows system configuration changes to be made without having to rely on a floppy disk-based utility (that always get lost the day after the computer is first installed).

Summary

After using the Z-286 for a while, we found ourselves increasingly attracted to its strong points: small footprint, quite operation, good keyboard, and fine performance. Zenith has done a good job in producing a machine which can be legitimately marketed as an alternative to IBM's mid-range PS/2s, and a strong OS/2 platform.

The relative price/performance value of the Z-286, however, doesn't appear to be attractive, since it's a premimum priced product. There are several 386 based machines sold in its price range, and many comparably equipped 286 based machines are selling for less. On the other hand, many Zeniths are sold at large discounts, mostly from large educational and governmental contracts.

Zenith's continued success in winning these large contracts, proves that they can price their product to sell, when needed. It's hard to not imagine that the Z-286 is large a part of their strategy to win even more. If you can find the Z-286 at a competitive price, it's an excellent piece of hardware. ●

LMS CM121 features SCSI interface.

Conference
continued from page 73

geographic information systems processing."

"In addition to the large educational market for this PC-based mapping package," continued Hanley, "the opportunities for inexpensive but effective geographic information systems exist in dozens of vertical markets including real estate, mineral exploration, transportation, hazardous waste management, local and state government, and many others. We believe that the agreement we have reached with Tandy will be a very effective means to penetrate a large number of these vertical markets."

BMUG to Produce "PD-ROM"

BMUG, Inc. (Berkeley Macintosh Users Group) has announced that it will publish a special anthology of its shareware library on CD-ROM. This product, called the BMUG PD-ROM, will include public domain software and shareware as well as digests of public messages from selected electronic services. The PD-ROM will give an individual easy access to several hundred megabytes of software and information which would previously have been difficult and expensive to access, store, and maintain.

Through an agreement with Discovery Systems, a publisher of compact disk products based in Dublin, Ohio, the anthology should be available for under $100 retail. "We were fortunate to team up with a publisher who shares our goal of delivering this material to the users as inexpensively as possible, like we do with our floppy-disk-based library of over 150 disks available at $3 each," said Stephen Howard of BMUG. "We're not looking at this project as a money-maker for the group; we're producing the PD-ROM as a public service to the community. The disk ties in nicely with BMUG's Registration Assistance Program, where we pay the postage and help deliver Shareware registration checks, to help both shareware users and authors."

Howard continues, "You would have had to be crazy to collect all this stuff before. Now, with the PD-ROM, you would be crazy to not to. Everyone who buys a CD-ROM for the Macintosh will want to have this disk."

The PD-ROM will be designed for use with Apple's CD SC compact disk drive and HyperCard system software. The contents of the disk have been drawn from a wealth of available material and will be tested and screened prior to publication.

"I think it's great," said Marsh Williams of Discovery Systems. "The price and utility of this product make it a terrific value for every Mac CD-ROM user." ●

Northgate
continued from page 33

remember what those were?). For the most part, however, the biggest problem was that the keyboards just had a bad feel.

Some people overcame that when they bought clones by purchasing IBM keyboards at extremely high costs. Seems pretty silly to buy a clone computer for $495 only to pay another $350 just for the keyboard! Believe it or not, many people did it!

As fate would have it, IBM decided they had to improve upon the keyboard and released a somewhat more conventional QWERTY keyboard when they introduced the PC/AT line of micros. The keyboards greatest asset lies in the oversized <enter> key.

Almost immediately, two armed camps of users formed—those that liked the original PC keyboard and those that were willing to relearn typing for the comfort of the new AT keyboard. No sooner did the dust settle when IBM announced the newest style keyboard which was a bastardized AT style keyboard with a bunch of extra keys stuck all over the place. Worst of all, however, was that they moved the location of the function keys, the ESC key and a few other often used keys. While some liked the new style, many didn't.

Enter Northgate and their Omni-Key 102 style keyboard. The Northgate 386 Tower comes with a new style keyboard. This keyboard is like a crossbreed between the new style keyboards and the old style AT keyboards. To begin with, the first thing Northgate did was to remove the function keys from the top of the keyboard and put them in the left hand side where they belonged.

The original keyboards only had ten function keys whereas the new 102 style keyboards contain twelve. Northgate got around this problem by putting the ten function keys in the normal location and then adding function keys 11 and 12 along the top row directly above F1 and F2 respectively.

Northgate duplicated the new style keyboards by adding the four button cursor control and the separate numeric keypad. They added the insert, delete, home, end, page up and page down keys, and the oversized entry key while leaving most of the other keys pretty

continued on page 77

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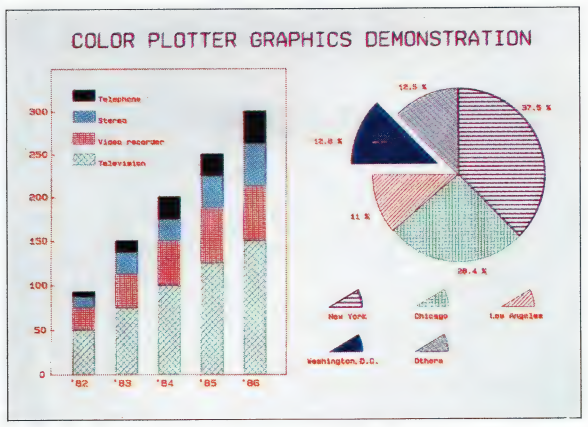

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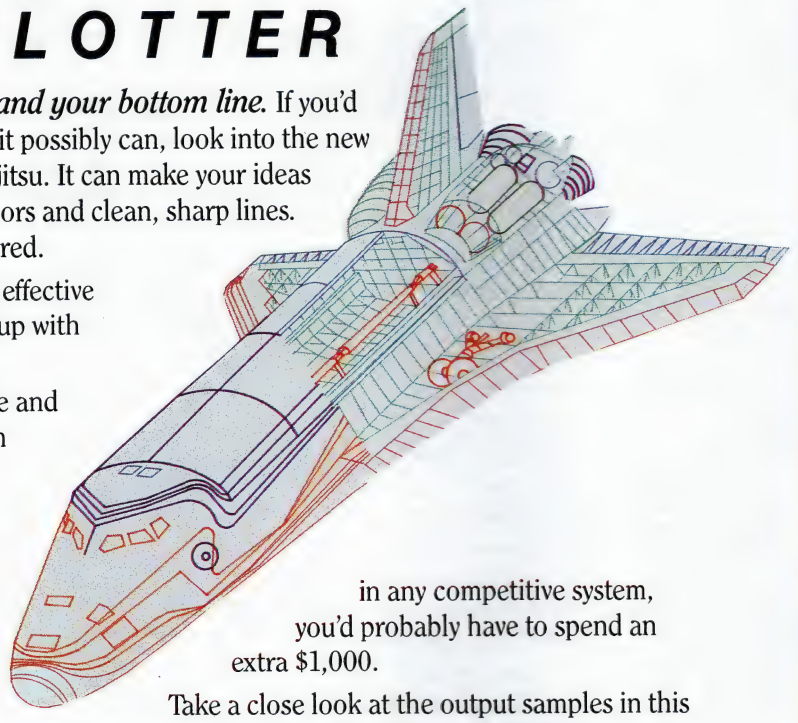

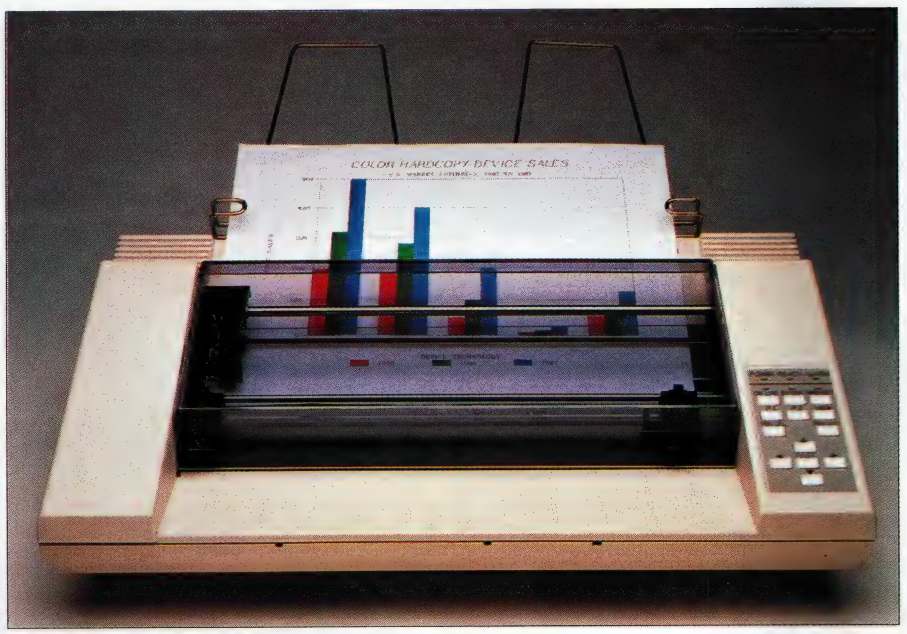

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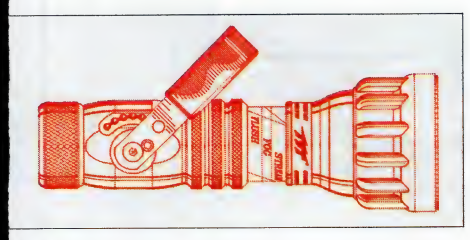

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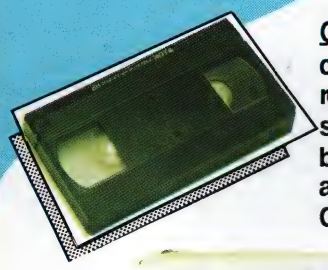

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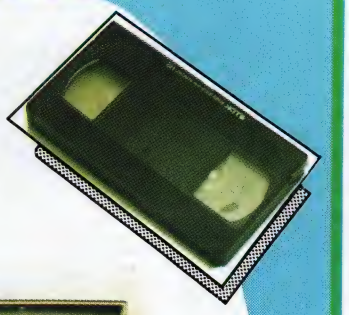

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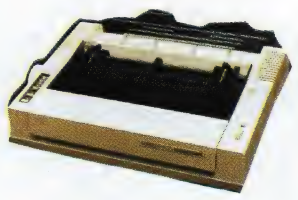

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Northgate continued from page 74

much in the same as an AT style keyboard.

While Northgate's Omni-Key keyboard has a somewhat light touch when compared to the original IBM PC, there is probably no clone keyboard that I know of on the market today that has a better tactile feel than the Northgate; it features the familiar click sound, click sensation and tactile feel of IBM's own keyboards.

Once again, I would like to say that the Northgate Omni-Key 102 keyboard is probably the most comfortable keyboard for those of you that have grown accustomed to the original IBM AT style keyboard while still wanting to upgrade to the new 102 style keyboards. They feature good tactile response, they're laid out well, are attractive and very pleasant to use.

For those of you that want a keyboard such as this but don't want to have to buy an entire Northgate system to get one, I might mention that Northgate markets their keyboards separately. They may be ordered directly from Northgate for approximately $100.

The Storage Devices

The Northgate 386 Tower, in its normal configuration, is equipped with an Adaptec 2372 RLL controller and a Miniscribe 3675 fixed disk. While the drive itself is not a real screamer (it has a 65 ms seek time), it makes up for that in a number of other ways.

To begin with, the disk and controller combination permit the disk to be formatted to a 1:1 interleave. In simple terms, that means that one revolution of the disk is all that is needed to read all of the data on the track.

I can thank Steve Gibson for the next little bit of trivia. According to Steve, the drive has six heads instead of four or five. The extra head further reduces the amount of movement that is necessary to read contiguous files which helps to increase the effective speed of the disk.

With Steve Gibsons permission, I used the new version of SpinRite, a disk utility program that he wrote that measures not only the capability of a hard disk but actually improves its operation, to test the Towers disks. I was able to confirm, for myself, many of the claims that Northgate makes regarding the performance of their fixed disk and controller. By the way, Lon Andrews is currently reviewing SpinRite for *Computer Shopper* so look for his review of this remarkable new disk utility.

Add to that a disk cache program (more on that in a moment) and you have a real winning combination! In fact, according to SpinDisk, (another program from Steve Gibson) the combination of the disk controller and hard disk result in a effective transfer rate of almost 800,000 bytes per second!

On the floppy side of the house, the Tower comes with two units—a 1.2 megabyte 5¼" AT style drive and a small 1.44 megabyte 3½" micro floppy drive. This means that you have the ability to read virtually all of the disk formats that have appeared on the PC since its introduction.

Disk Cache Program

Northgate bundles a disk cache program with their systems called "QCACHE." The program, which was written by P.R. Glassel and Associates, acts somewhat like a RAM disk. When a disk read is requested, more data is read into memory than is needed to meet the call. Subsequent calls to the disk are checked to see if the data has already been read into memory and, if so, fills the subsequent read requests directly from RAM.

Don't confuse this program with the high speed 64K RAM cache on the motherboard; QCACHE uses standard base memory for its buffers.

Programs such as this help to provide a significant reduction in the number of physical accesses to the hard disk. Since RAM requests are filled very quickly, the overall effect is to speed up the systems performance.

VOPT Disk Optimization

Aside from the physical access delays encountered when using the fixed disk, fragmented files also cause processing delays. In order to minimize this, Northgate bundles VOPT with their Tower and includes the program in the AUTOEXEC.BAT file.

This program, which is marketed by Golden Bow Systems, rearranges the location of files on the fixed disk so that all of their clusters lie contiguously. A subsequent read to such a file would be faster since the disk head does not have to travel as much. There are several such programs currently on the market, the most popular of which is Nortons Speed Disk.

Since the program is included in the AUTOEXEC.BAT file, it is executed every time the system is rebooted. As a general rule, it only takes it a few seconds to unfragment all of the files on the fixed disk.

Unlike Norton's program, VOPT does not appear to keep all of the files inside a directory together. It simply eliminates the individual file fragmentation.

Benchmarks

Testing high speed 80386 based machine using software designed for the 8088 is kinda like testing a race car capable of traveling in excess of 300 mph in the parking lot of K-Mart on Sunday. There really isn't any good way to compare the two systems. Furthermore, there really isn't any software that takes full advantage of the 32 bit architecture of a 386 based machine.

As such, I'll be forced to compare the Tower against an average 10MHz 1 wait state 80286 based machine.

Norton SI (comparison to a PC/XT)

10MHz AT 9.8

16MHz Tower 18.4

Prime Number Benchmark (involved 6,618,116 divisions)

10MHz AT . . . . . 69.5 seconds (1265 timer ticks)

16MHz Tower . . . . 33.4 seconds (608 timer ticks)

Seconds to perform repetitive mathematical calculations:

OPERATION	AT	TOWER
Time used in int addition :	17	7
Time used in long addition :	21	8
Time used in float addition :	622	289
Time used in int subtract :	15	7
Time used in long subtract :	16	7
Time used in float subtract :	281	132
Time used in int multiply :	16	7
Time used in long multiply :	17	6
Time used in float multiply :	284	133
Time used in int division :	15	6
Time used in long division :	16	7
Time used in float division :	280	132

As you can see, in almost every case the performance of the Tower was approximately 250% greater than that of a fairly fast AT.

Conclusion

The Northgate 386 Tower is an impressive system. Operating approximately eighteen times faster than the original PC, the system would be an ideal choice for those requiring hard core processing power; especially in applications such as CAD systems, file servers and demanding software development work.

Despite the fact that it is marketed solely via mail order, the system arrives ready to plug in and go. The fixed disk arrives pre-formatted complete with the MSDOS 3.3 operating system. The disk drives are installed and the system is properly configured right down to the AUTOEXEC.BAT startup program. Add to that one of the best warranties in the industry and you have a system that even the most leery mail orderer can appreciate and order with confidence.

It has an exceptionally nice keyboard and is compatible with 360K 5¼" floppies, 1.2 meg 5¼" floppies, 720K 3½" floppies and 1.44 meg 3½" floppies.

Since it features the Intel 80386 processor, it is not apt to become obsolete for at least three or four years. Furthermore, it is compatible with the new OS/2 operating system.

For further information contact Northgate Computer Systems, 2905 Northwest Boulevard, Suite 250, Plymouth, MN 55441; (800) 548-1993. ●

8-Bits continued from page 44

combination that helps programmers get the most out of Atari BASIC.

Of course, there is also a fascinating stream of new hardware products for the Atari, including an inexpensive picture digitizers, a multi-systems box, high speed disk-drive modifications, and RAM memory expansions to 1 Megabyte and beyond. Magazines, such as *Antic, ANALOG,* and *Computer Shopper*, continue to feed Atari 8-bit owners with all sorts of information, including reviews, programs, and tutorials.

Atari has shown that it recognizes the strength and magnitude of the 8-bit community, by continuing to develop and release new hardware. The company recently released the XE Game System, which is fully compatible with 8-bit computer software (if a disk drive is included), and promises to revitalize major software manufacturer interest in the 8-bit machines in a very big way. Atari has also recently released the SX212, an inexpensive 300/1200 baud modem that's fully compatible with the 8-bit machines. Atari will soon be releasing the XF551 disk drive, a double-sided, true double-density drive, featuring a specially designed DOS called ADOS.

Undoubtedly, it's in the active Atari Users Groups that 8-bit machines are the most alive. Atari user groups and their dedicated members develop and share 8-bit programming ideas, hardware projects, software reviews, and product recommendations. User groups are responsible for most technical and compatibility information, as well. Most user groups publish newsletters, and maintain vast public domain software libraries for the 8-bit machines. These groups are the ideal place for new 8-bit owners to get their feet wet, and get up to speed on the world of Atari computing.

Commodore C-64

by D. Roderick Eamon

"Obsolete, a toy—the operation suceeded, but the C-64 died."

While the supposed "mainstream" of computing wrote off 8-bit computers several years ago, the "rest of us" are still using them to do all kinds of useful things. Commodore 8-bit owners just ignore sayings like the one mentioned, usually made by 80386/68000 owners who don't understand that 8-bits are more than enough computing power for 95% of the home user base. C-64/128s continue to evolve with some of the best-priced and most extensive software base available. Not just alive and running, the Commodore world is reaching for the stars. Take the past year, for example.

Hardware: A new 128D entered the fray. Hard drives appeared (Lt. Kernal and JCT). Commodore, itself, introduced the 1541 model II floppy drive, which is a cooler running and more compact version of the venerable 1541. Also from Commodore came the

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8-Bits
continued from page 77

sleek new 1581 drive, bringing 800K and 3.5 inch drives to the Commodore world. Many 1541 and 1571 clones arrived by the trainload, from several sources. And floppy drives weren't the only new storage devices.

Commodore introduced the 1764 RAM expander, increasing total RAM storage of the C-64 by 256K. Other new toys included the new 1351 mouse, light pens, joysticks (Icontroller for one), MIDI devices, and printers. All these input devices are implicit acknowledgements of the C-64's further entrenchment as a graphic computer.

Software: Last year brought games rife with hi-res graphics, digitized sound, and dazzling creativity. In productivity, GEOS came of age as Berkeley Softworks pumped out geoCalc, geoFile, geoPublish, and geoProgrammer. Third parties were also active in the desktop publishing realm, with Spinnaker's Word Publisher, and Softsync's Personal Newsletter. Electronic Arts released Paperclip Professional and Timework's Desktop Publisher gave users a large choice of options.

Statistics: In 1987, Commodore posted a major financial gain, netting $27 million in the fourth quarter. The Amiga accounted for about 40% of that total, or $10.8 million. The C-64/128 added about $10 million to the pie, and the rest came from Commodore's various PC clones. As you can see, a good hunk of Commodore's finances are still dependent on the success of their 8-bit machines.

To date, over 7 million C-64s and C-128s have been sold, with the expectation that 10 million units may be reached in late 1988 or 1989. This means the C-64/128 installed user base is larger than any other single model of personal computer, worldwide, including IBM PC, Apple II, or anything else. Is Commodore 8-bit dead? Hardly!

A look ahead: The C-64C is now the standard bearer, with C-128 split into two models: the C-128 and C-128D. There are persistant rumors of a C-64D, with built-in disk drive, and some talk about a C-128 laptop. Whatever Commodore has in mind, they know that 8-bits are still a significant part of their business and will continue to support them as long as they sell well. At Commodore, "the number 8 is still alive!"

Commodore C-128

by Cheryl Peterson

The Commodore C-128 is still, to my mind at least, the best 8-bit computer available. In fact, I think the C-128 is a much better buy, in the long run, than an IBM PC or clone. While this may sound ridiculous to some dedicated IBM owners, the fact is that the software available for the C-128 is every bit as good as that for the IBM, and in almost every case, it's cheaper. If you look at the suggested list prices for software marketed in both IBM and C-64/128 versions, the IBM version will almost always be more expensive. And the Macintosh or Apple II versions are usually higher too.

Further, with many of the IBM vendors running off in pursuit of the PS/2 market, it may be that some IBM PC-DOS users will be left out in the cold, as support for their older versions of software is diminished. Most software company respresentatives that I have talked to have confirmed that they intend to continue to market and support their C-64/128 software for quite some time.

New products are still being actively developed and the last year has seen great strides in desktop publishing and word processing software for the Commodore machines. Of course, the traditional software strongholds of Commodore are games and education. There have been many new titles in each catagory released in the last year. Almost any new game or education package that has been written for any other system is eventually also ported to the C-64 within 6 months or so.

Of course, an additional advantage of the C-128 is its use of the CP/M 3.0 operating system. This insures that the machine can also tap into the vast amount of business software already out there for CP/M. With both CP/M and C-64 compatibility, in addition to its own native mode, the C-128 is still an excellent value, perfectly suitable for many home and small business users. You can expect it to remain a viable force in this market for several more years.

Tandy CoCo

by Dan Robins

Tandy Corporation announced three new computers in 1981: the Model III, the TRS-80 Pocket Computer, and the Color Computer. Equipped with only 4 kilobytes memory, the first CoCo carried a price tag of $399. Not too many computer models have survived more than seven years like the Color Computer, but the CoCo has seen some changes during that time.

The CoCo2 came along a few years later, offering a different look, and new internal electronics. And in 1986, Tandy continued the tradition with the vastly improved CoCo 3. Memory availability for the CoCo has grown from it's original 4K to 512K for Color Computer 3. Several different loadable operating systems have been offered through the years, including Flex and OS9. Last year came the lastest OS/9, Level 2, which is now a true multi-tasking/multi-user operating system developed by Microware.

Offering a myriad of "program packs" for the Color Computer, Tandy apparently seems comfortable in offering the computer as a game machine. From a business standpoint, their decision is wise, as it has and probably will continue to generate quite a bit of income for the corporation. The CoCo, however, is much more than just a game machine. As you turn the power on, it automatically enters an interpretive BASIC language environment, also referred to as RS-DOS. The programming space of the CoCo depends on the memory of the computer. A 64K Color Computer has about 27K available for the user to program with. The manual which accompanies the computer will provide a first time computer user an extremely good tutorial on programming in the BASIC language. Keeping in mind that the CoCo is not an IBM compatible computer, it does offer a good education in computer operations and programmng for the entry level user.

A milestone was reached in late 1986 with the release of the Color Computer 3. The CoCo was now equipped with 128K memory (and expandable to 512K), higher resolution graphic screens, and text screens which were selectable between 80, 40, and 32 columns.

The OS9 Operating System also took a giant leap in 1987 as Tandy released the OS9 Level 2 Operating System. Breaking the 64K memory barrier of OS9 Level 1, the new version takes advantage of all the memory available on the CoCo3 and offers a unique windowing environment. Multi-Vue was recently released by Tandy as an add-on for the OS9 Level 2 system. This graphics environment (along the lines of a Macintosh) offers a mouse-based interface which seems to be gaining interest and use among OS9 Level 2 owners.

Some computer experts will contest that the CoCo is an 8-bit computer because of it's 16-bit address line. According to the "spec sheet" of the 6809 microchip produced by Motorola, it is referred to as an 8-bit microprocessing unit.

The outlook for the Color Computer remains healthy regardless of rumors. These same rumors have surfaced now and again since 1983! During the last Christmas season (1987) the CoCo outsold it's MSDOS counterparts, unit-wise, 2-to-1 at Radio Shack stores. Rumors of a Color Computer 4 have surfaced, however it is just that, a rumor. For someone with the desire for an inexpensive entry level computer, the CoCo should be one of the computers considered in any decision.

Timex/Sinclair

by Mark Fendrick

Here we are nearly a decade after Sinclair Research Ltd. of England introduced the first computer that sold for under $200.00, and despite the many obituaries written about Sir Clive's computers, they are still around and far from being abandoned by their faithful owners.

The Sinclair line of computers fall into three categories—the ZX-81 (includes the Timex/Sinclair 1000 and 1500 models); the ZX Spectrum (the T/S 2068 here in America) and the QL. Each of these computers' owners can still find new developments for their model.

Although the ZX-81 basic unit only contains 1K (the T/S 1000 doubles that to 2K and the T/S 1500 sports a whopping 16K), its 8K ROM contains a remarkably powerful operating system and BASIC. Because of this, it is possible to create a number of hardware/software items, and this development has continued through today.

The place to look for ZX-81 developments is Silicon Mountain Computers (C-12 Mtn. Stn. Group Box/ Nelson, BC V1L 5P1/CANADA). Fred Nachbaur, the force behind Silicon Mountain Computers, believes in the ZX-81, and that is the only computer they work with. New products which they introduced this year included a HiRes routine which was at the heart of games and productivity software. A variable column telecommunications program utilizing this routine was also introduced. This program actually supports XMODEM on the ZX-81. A new version Non Volatile Memory board was introduced as well as well as a replacement ROM for those who bought the PC8300 (a T/S 1000 clone) hoping for a true compatible. Although the PC8300 was not fully compatible, this replacement chip accomplishes this.

If you have a ZX-81 (T/S 1000 or 1500) you should write to Silicon Mountain Computers for their latest catalogue. (Mr. Nachbaur informs me that more is still on the drawing boards.)

The T/S 2068 benefits from the fact that it's British forebear, the ZX Spectrum, was the most popular micro in Europe, and even now, after the sale of Sinclair Research to Amstrad, there is a large user base. For this reason new titles still appear with great frequency in England. Those computers with Spectrum emulators can use most of these titles which may be ordered directly from England. Many of the more popular titles have been brought to this country and adapted by Knighted Computers (707 Highland Street, Fulton, NY 13069) for use by the unmodified T/S 2068.

Additionally, a number of smaller hobbyist/developer/dealers in this country and Canada continue in the Sinclair tradition and are still developing new products for the T/S 2068.

Lastly we will just touch on the QL, as there is some argument over whether or not it is an 8 bit computer. Running the Motorola 68008 chip it can be considered a 32-bit computer, but it was designed with an 8-bit communications bus.

The QL continues to be sold in the U.S., although stocks should run dry this year. A number of dealers still actively support the computer and new software (mostly from the U.K.) appears regularly. A number of QL clones have appeared and may be easily available in the U.S. this year. Keep watching the Sinclair Survival column here in *Computer Shopper* for ongoing news.

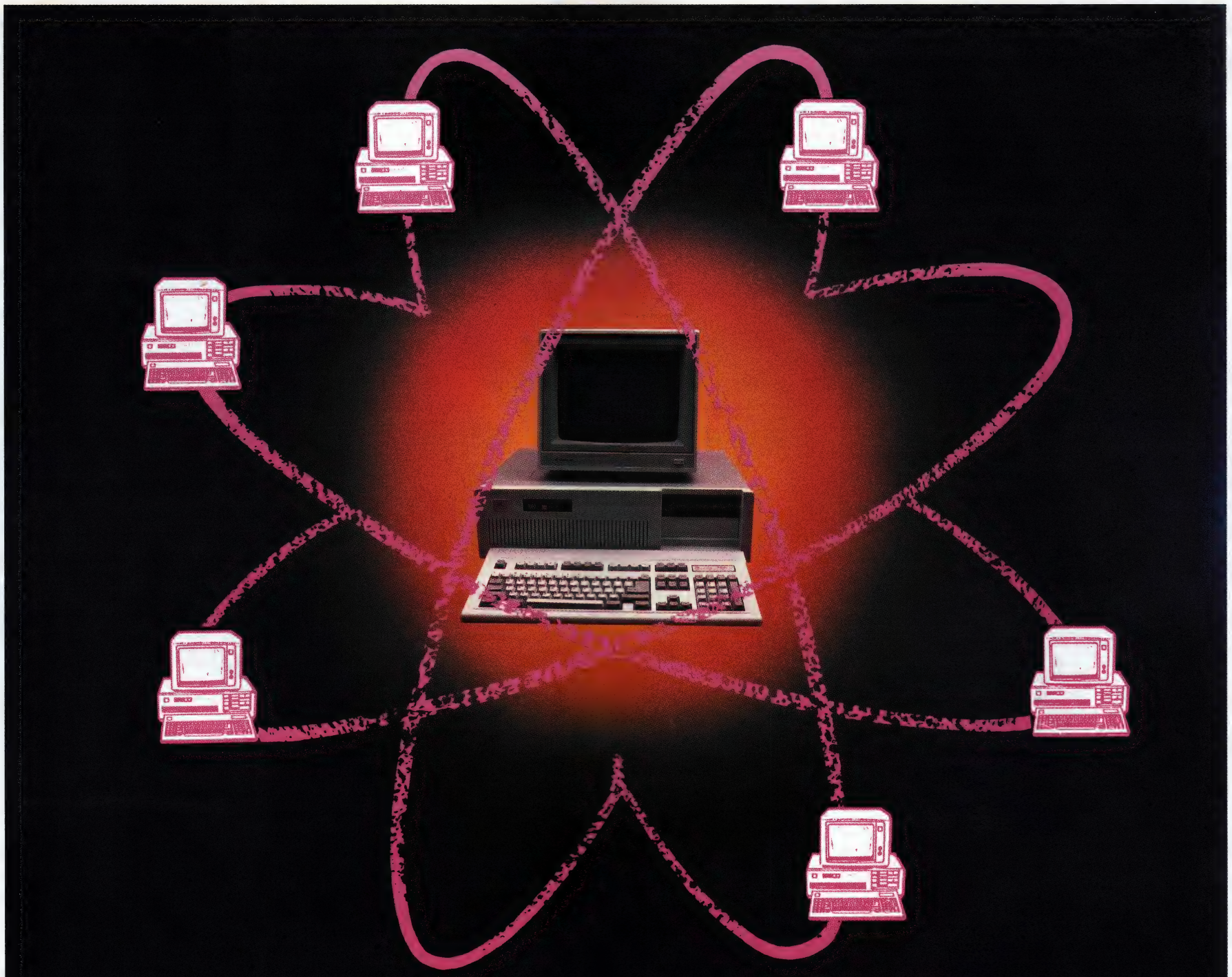
Finally, Sinclair owners have kept their machines viable through a number of conventions. The first nationally successful T/S Fest was held in 1986 in Cincinnati, and a number of other regular conventions have emerged since then. Most notable in addition to the highly successful Midwest T/S ComputerFest is the Great Northwest Mini Fest. A Florida convention was held in March of this year, and it looks as if the coming year will have its share of these get togethers. Try to attend one and you will see that the Sinclair community is still alive and well.

TI-99/4A

by Jonathan L. Zittrain

The Texas Instruments TI-99/4A is a computer that has fueled a remarkable community—a large and

continued on page 85



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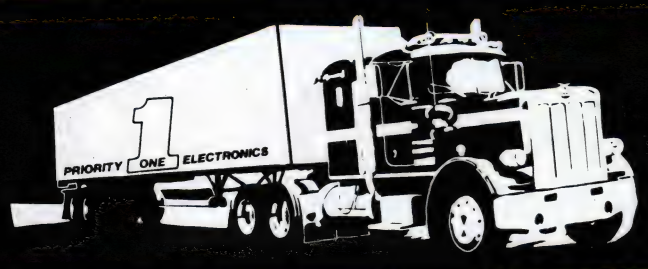

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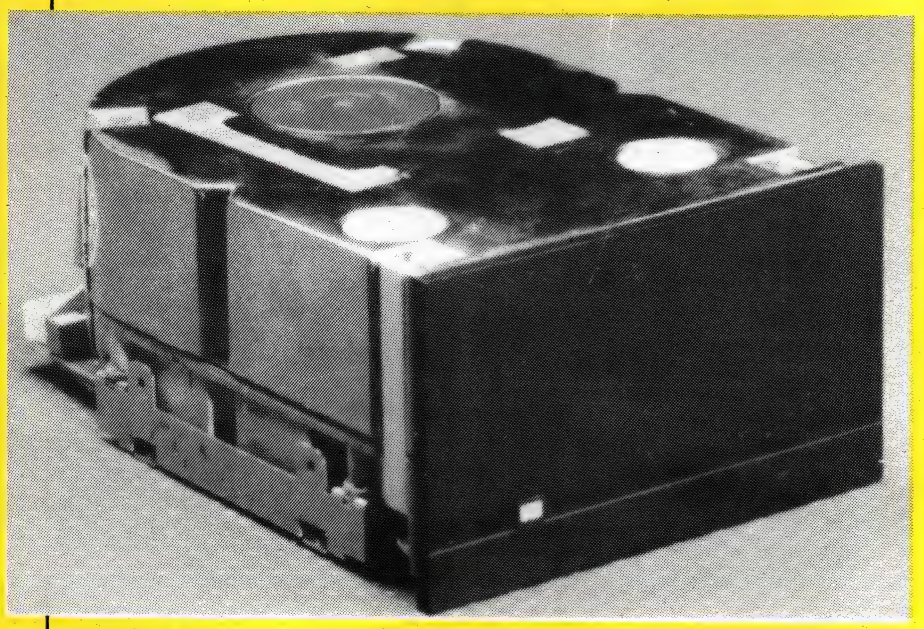

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8-Bits
continued from page 78

multi-faceted group of people that has flourished even after TI officially stopped supporting the machine in October of 1983.

The TI-99/4A was originally conceived by TI as a colorful, friendly, general- purpose home computer that would appeal to families looking to use it for education and home tasks, as well as hobbyists eager to see what an electronics giant such as Texas Instruments would put under the hood of its first computer venture.

The hobbyists weren't disappointed—the TI-99/4 (and later the 99/4A) was and is a phenomenal machine. Fully bit-mapped graphics with sixteen colors (usable on any TV set), four-voice sound, a 16-bit processor (albeit with an 8-bit bus; hence the TI-99/4A has a place in this article!), and the only BASIC compatible with the ANSI standard were just a few of the features that made the 99/4A stand head and shoulders over the giants of the time such as the Atari 800 and the Apple II + .

The TI community of today is well over 300,000 strong, with a staggering 1,000,000 TI-99/4A consoles actually sold by TI over the years. Those 300,000 consist of people who still have just the basic console, using it with plug-in educational and game cartridges as well as those who have "full-blown" systems. Both ends of the user spectrum combine as members of the hundreds of TI users groups still amazingly active across the world. Most have monthly meetings and newsletters, and boast greater attendance than many corresponding users groups for machines still supported by their manufacturers!

Users groups from areas such as Boston, Chicago, Seattle, New Jersey, DC, and Los Angeles host "TI fests," trade shows that give distributors, authors, and consumers a chance to get together in person to exchange goods and talk TI.

What is perhaps most interesting is the incredible variety of software available for the TI-99/4A. There is a fairly active set of TI distributors, and many authors have additionally taken to "fairware" to release their programs. Paul Charlton, a computer science student at RPI, was the first to port over XMODEM communications protocol for the 99/4A in his popular fairware program FAST-TERM. FAST-TERM, and other later additions, enabled TI users to set up an extensive network of bulletin boards across the country for the exchange of TI news, views, and software. PC Pursuit, a service that allows long-distance computer calling for a flat $25/month rate, has greatly contributed to the effectiveness of this network. National networks such as CompuServe, Delphi, the Source, and most recently GEnie have also been hotbeds of TI activity.

The original BASIC, FORTH and assembly programming languages have long been supplemented. Clint Pulley, another hobbyist hacker, made available a version of small-C for the 99, and the late Thomas Weithofer wrote an implementation of PILOT from scratch. The UCSD p-System IV.0 is also available via an expansion card.

A few companies have expressed interest in producing computer upgrades for the TI-99/4A that run all the original software but also take advantage of later computer industry developments and innovations, offering higher screen resolution, faster processing, and mouse-integrated graphics. One has even started production (Myarc's Geneve 9640). This raises the prospect of a fresh infusion of interest and enthusiam for the Texas Instruments 9900 family.

Yet even without new-fangled technology, the TI-99/4A computer is no slouch, and still has a comfortable place on the desks of many people—to help with home finances, education, programming, gaming, and telecommunications. The TI-99/4A simply refuses to die!

Heath/Zenith

by George M. Ewing

For those who aren't aware, Heath Company, of Heathkit fame, is one of the oldest manufacturers of microcomputers in the US. Heath offered their first digital computer in the late 1950s (as a kit, of course)! In the mid and late 1970s Heath offered a wide variety of computer kits, including the H-8 (an 8080 based system) and even a DEC PDP-8 clone. In between were a large selection of teminals and peripherals. The H-8 eventually ended its life as the H-89, a Z-80 based system that combined the CPU and terminal, with two disk drives, in an internal enclosure. A pre-built version, the Zenith Z-90, was also available.

A short time after the merger between Heath and Zenith a few years ago, the direction of Heath's computer division went away from 8-bit HDOS and CP/M to MSDOS and IBM compatibles. However, there is still a large, and stalwart following in the Heath/Zenith 8-bit world. If you don't believe that, you probably haven't been to any Hamfests or computer swap meets!

So what happened in the last year to the H/Z 8-bit world? Well, some good things and some bad things. Unfortunately, we have seen the end of the TMSI H-1000. Technical Micro Systems, Inc. a longtime Heath/Zenith aftermarket supplier, has announced that, effective March, 1988, they will no longer manufacture or sell the H-1000 Z80 / 8086 upgrade board for the H/Z-89, and they will no longer be doing business. Persons with business or financial inquiries should contact Mr. Terry Donelley at 366 Cloverdale, Ann Arbor Michigan, 48105. While most of the publicity and interest in the H-1000 was with regard to its capabilities as an MSDOS upgrade, many of us remember it better as a fantastic Heath-compatible 8-bit machine; with one Megabyte of on-board memory and the 8MHz 8086 running as a RAM disk controller, both CP/M and HDOS H-1000 users joined that select fellowship of dual-processor, high-power hybrids that also included owners of the less powerful Xerox 8/16 and the Seequah Chameleon.

The Heath community will also sorely miss the other support products from TMSI, such as their H-37 soft sector disk controllers, Flicker Free kits, and other hardware. Former TMSI chief engineer, Lee Hart, has purchased most of the remaining inventory and surplus parts from the company, and has promised to make these available to 8-bit users as long as the supply lasts. Contact him for details: Lee Hart, 28612 Middle Crossing Rd., Dowagiac, MI 49047 (616)782-3980.

In other news, I continue to be pleasantly surprised by the low price and availability of Heath 8-bit gear on the used and surplus market. Check out your local HUG group, conventions like HUG-Con and CHUG-Con, and Hamfests and swapmeets. Don't forget that there were a lot of H-89's and, especially, H-19 terminals, bought up by colleges and universities in the early days, as well as some by government agencies, and the majority of them are now hitting the surplus market. The University of Michigan was recently unloading H-19's in working order for prices in the $25-$50 range, for example, so keep your eyes open, and don't forget the want ads here in the *Computer Shopper*, especially those from smaller surplus dealers specializing in Heath stuff, like Al Davis, et. al.

Software is too big a topic to cover in detail here, but highlights include last year's release of HDOS 3 (check with your HUG groups)and the proliferation of ZCPR and look-alike user shells that allow CP/M H-89's to do all sorts of things that used to require an MSDOS machine, or even Unix. Even TSR (Terminate And Stay Resident) utilities are available, despite the 64K Z-80 memory limit. My favorite for CP/M is still Write Hand Man, which does most of what Borland's Sidekick can do for MSDOS machines, only in about 10% of the space on disk and even less than that in memory.

Finally, in publication support, in addition to items here in *Computer Shopper* from time to time, there is much to be learned from Buss, H-Scoop, Walter Jankowski's 8-bit column in *Sextant* Magazine, and Len Geisler's *SEBHC Journal*, a $15-a-year monthly out of Ann Arbor. BUSS, SEXTANT, 716 E St. SE Washington, DC 20003 (202)544-0900. SEBHC JOURNAL 895 Starwick Dr. Ann Arbor, MI 48105 (313)769-6052.

FOG—A User Group Not Ashamed of 8-Bits

For users of any of the many CP/M based machines out there, whether they be Heath/Zenith, Osborne, Kaypro, or even a C-128 or Adam running CP/M, there is an especially good resource available. FOG (formerly the First Osborne Group)is now billing themselves the "International Nonprofit Computer Users Group." FOG has taken on the Herculean task of organizing many independent user groups, hundreds of BBSs, and lots of CP/M public domain software into a cohesive network of support. While they are still mainly centered on CP/M systems, FOG also has a very active MSDOS section, with a continually growing public domain library as well.

For a yearly membership fee of $25, FOG members can get *FOGHORN*, the FOG CP/M oriented magazine or *FOGLIGHT* the MSDOS magazine. The membership also includes access to a network of BBSs, extensive public domain libraries, and a telephone "hotline" for technical assistance. With a total claimed membership of 17,000 worldwide, FOG is providing an essential service by becoming a national (perhaps international)clearinghouse for information on the popular CP/M operating system. For more information about FOG, contact them at P.O. Box 3474, Daly City, CA 94015 or phone (415)755-2000. ●

Computer Programs For Baseball Card Collectors

Compu-Quote, the software house noted for its special programs for coin and stamp collectors, has added new versions to its existing Baseball Card collecting package, CARD/FAX.

Collectors of cards produced by Donruss or Fleer may now order additional disks covering those areas. These disks are a supplement to the original version which contained information on all of the cards produced by Topps, the leading company in the field. These software packages contain the descriptions and latest market value prices for all of the thousands of cards created by these companies.

Previous owners of CARD/FAX can obtain either the new Donruss or Fleer versions for an additional $45. First time users can select any one of the three versions as part of the complete package which sells for $95. The package includes a 28 page User's Guide, an Annual Update Request form and an Owner Registration form. CARD/FAX is available for IBM compatible machines as well as the Macintosh.

Annual Market Price update disks are available each May and can be ordered for an additional $25. Delivery on all products is one week.

The update disk can be merged with the user's existing CARD/FAX program to automatically replace each card's previous value with its current market price. The entire process takes only a fraction of the time that could be spent on the task if handled manually.

For collectors who wish to sample the program before committing to a purchase, a special No-Risk offer is provided by Compu-Quote. Potential CARD/FAX users can obtain a demonstration Preview-Pack for only $15. This version allows them to enter up to 25 card records and witness the capabilities and pricing features they will find duplicated in the full program.

The CARD/FAX package or Preview-Pack is available directly from Compu-Quote at 6914 Berquist Avenue, Canoga Park, CA 91307. VISA and Mastercharge orders are accepted. A toll-free order line is available at (800) 782-6775. ●

Celebrating Ten Years Of BBSing

by Curt Phillips

BBS Of The Month

Phone: 312-545-8086; PC Pursuit Accessible?: Yes; Name: Ward and Randy's CBBS; Location: Chicago, Ill.; BBS Software Type: CBBS; Features: Messaging only; Modem Speeds: 300/1200/2400; Parameters: 8N1, 8 bits, no parity, 1 stop bit; Sysop: Ward Christensen; Fees: none.

This BBS is the granddaddy of them all. We are now in the second decade of computer bulletin board systems, because this BBS has been in operation since February 16, 1978 (my apologies for this column not appearing closer to the tenth anniversary).

When saying that this was the first BBS system, some might feel the need to add qualifiers, such as the first telephone access "microcomputer" based BBS—but the simple fact is, of BBSes as we know them today, this was the first.

I talked with the Sysop Ward Christensen to find out what motivated him to start a microcomputer BBS. I interviewed him via E-mail on both this BBS and CompuServe, as well as by telephone (voice) and the information contained herein is from those conversations. If you recognize his name, that may well be because he also wrote the Xmodem file transfer protocol that is still widely used today.

As an early user of microcomputers and modems and active in a Chicago area computer club, Ward Christensen realized one snowy day in early 1978 that he had a spare CP/M computer and a spare phone line (for computer club information exchange). Prices for Hayes internal (S100 bus) 300 baud modems had then fallen below $300, and the time seemed ripe for a computerized way for computer club members to exchange information.

With his friend Randy Seuss handling the task of interfacing the hardware, he set about to write the software to handle the information exchange. In a couple of weeks Randy Seuss had the 32K RAM CP/M system ready, complete with two 8" floppy drives (241K of storage each) and a Hayes 110-300 internal modem. For the information of those of you who have come of late to the microcomputer world, and are accustomed to 640K of RAM standard and 20 Megabyte hard drives being scorned as small, this was a hot system in its day. To even have a floppy drive in 1978 put you in elite company.

Ward called his software CBBS for Computerized Bulletin Board System since he was somewhat emulating the functions of a cork bulletin board for information exchange. Though the official birthday of the BBS is February 16, 1978, Ward reports that the board was actually in operation for some days prior to then.

Sometime thereafter the board was upgraded to a Northstar Horizon (S-100 bus, 4 MHz Z80 CPU, 64K RAM) with a 5 Megabyte hard disk and a PMMI modem handling 110, 300, 450, 600 and even 710 baud. Again, all of this was considered quite advanced in the pre-IBM PC days.

Today, Ward and Randy's BBS operates on a PC clone motherboard running a V-20 with 2 Megabytes of RAM (via an Intel Above Board card) and a 20 Megabyte hard disk. All this gear is not in a case, but is mounted ("artistically," so it is said) on a 2'x4' piece of particle board. The modem is a US Robotics Courier 2400.

Ward's CBBS software has also been upgraded several times. Despite his authorship of the Xmodem file transfer protocol, this system is a MESSAGE ONLY BBS. Its purpose has always been for message communication between computer hobbyists.

Appropriate topics of conversation on this BBS are listed as C, assembler, AI, programming techniques, communications and computer interfaceable music synthesizers. The CP/M, Unix and MSDOS/PCDOS operating systems are specifically listed as areas for discussion. The stated policy is that no messages be left on non-computer topics and that messages about the Atari, ADAM, Commodore 64/VIC-20, COCO, TI, TRS-80, games, etc. are not supported on this BBS. "For sale" messages (both commercial and non-commercial) pertaining to appropriate topic areas are encouraged.

This is not the easiest BBS in the world to use. Back when Ward wrote the first version of CBBS, the words "user" and "friendly" had not been misused, confused and abused as they have been today. This BBS is described as for the "more advanced, technical hobbyist," and if you have a reasonable amount of computer savvy you won't find it hard to use, but to help you out, an abbreviated keyword help file is printed at the end of this column. The opening menu is listed in Figure A and a "Quick Help" screen is printed in Figure B. Since it also lists itself as for "those who want to become a member of this group (the more advanced, technical hobbyist)," don't let its straightforward manner intimidate you. The "?" and "H" commands are always there to guide you.

If you choose to call Ward and Randy's BBS, leave them a message thanking them for their innovation and effort in establishing this BBS. A large and important aspect of today's computer world got its start here, and this is where the credit is due.

We Won (For Now)

About a year ago, the Federal Communications Commission announced a proposal to substantially increase telephone "access" charges for business and home computer users. Due to a large volume of mail nearly unanimously opposing this proposal, the FCC indicated recently that it had dropped these plans.

In fighting off this proposal, the computer/telephone user community has avoided an increase of about $4.50 per hour to the cost of connecting to database services like Delphi and CompuServe.

I put "for now" on the subtitle because this proposal is almost sure to be revived sooner or later, and we must be vigilant to again quickly let our feelings be known when this happens. Meanwhile, congratulations to all who worked toward defeating this proposal.

Semantics

Some people are upset that I sometimes use the acronym "BBS" as a verb. All I am attempting to do is to achieve a shorthand way of expressing "the act of calling and connecting to a computer bulletin board system." To this end, I expect to see this new definition in the next edition of *Webster's Dictionary*.

Help For Ward And Randy's BBS

Listed here is a quick summary of what to do your first time on Ward and Randy's BBS:

1. O—Use the O function to retrieve (O)ne-line message summaries (or Q for quick (subject only) summaries)

* When prompted for a starting message number, use -50 to start 50 back from the highest message on CBBS.

* Use control-S to stop/start output.

* Every time you see a message of interest, press return, and key in its message number (or numbers separated by ;)

* Let the summary complete, or Press control-K to return to menu.

continued on page 116

```
** WELCOME TO WARD AND RANDY'S CBBS(R)
** (COMPUTERIZED BULLETIN BOARD SYSTEM (R))
** (In operation since 2/16/78)
   (Therefore, the worlds first, and oldest micro based BBS)

   CBBS is a MESSAGE-ONLY system catering to advanced hobbyists, etc
----> PRESS "S" TO STOP OUTPUT, "S" TO START IT AGAIN <----
        (NO DATA WILL BE LOST)

CONTROL CHARACTERS ACCEPTED BY CBBS:
]
ASCII  CTL
CHARS  CHARS (^ means "control key" with letter key)
-----  ----- While CBBS OUTPUTS to you:
 DEL     ^H   Character delete
  C      ^C   Cancel output
  K      ^K   Function abort
         ^N   Send 5 more nulls
  S      ^S   Stop/start output
-----  ----- On INPUT:
         ^I   Tab (Tabs set every 8)
         ^R   Retype input line
 ESC     ^U   Line delete
         ^W   Video Word backspace
         ^X   Video line delete
 >> We do NOT use BREAK!  Modem may disconnect if you use it.
        Use ^C or ^K instead! <<
If you get stuck, try:  Ctl-K then C/R
        until you bail out back to the main menu.

Whenever we refer to "C/R", we mean your "return" key!!

]Use ";" to separate multiple answers, i.e.
        n;firstname;lastname;x;p;
would log you in, set video mode, expert mode, no prompt bells.

----END OF WELCOME----
Function: /,B,E,G,H,K,N,O,P,Q,R,S,T,U,V,W,X,#
(OR ? IF NOT KNOWN)?
```

Figure A. Ward and Randy's BBS Welcome Screen(s)

```
QUICK HELP: O to get One-line summaries; R to retrieve, G for Good Bye.

---MAJOR FUNCTIONS: Press: ^C-skip to next section; ^K-abort back to menu.

(E)NTER MESSAGE |(H)ELP <==      |(Q)uick summary
(G)OOD BYE      |(R)etrieve msg |(S)ummarize msgs (see newer (O) below)
(/) Quick good-bye
]       MINOR FUNCTIONS: Press ^K-to abort (^ means control-)
# Print caller # etc|(P)rompt bell off  |(U)ser update (Remember eXpert, etc)
(A) (not available)  |(K)ill message     |(V)ideo backspace change
(B)ulletin reprint   |(N)ulls: How many? |(W)elcome reprint
(C)ase upper/lower   |(O)NE LINE SUMMARY |e(X)pert user mode
(D)uplex:echo off/on |(T)ime/date/E.T.   |

] >> For details, type H, press return, then type the command letter. <<
HELP New user help; (vs. H:  keyword based help)
MINE find my messages (automatically executed at sign-on)
NEWS What's new on CBBS (Last updated 6/17/85)
SHORT Shorten output: no dup spaces, etc
FIND firstname lastname - find a caller's last call (exact spelling only)
FULL full-line edit mode (ala WordStar) (NOT full screen)
R;16 for list of other systems
New users: If you don't know what else to do, start with:  O;1
   or q;1 for quick subject-only summary.  If short on time,
   or to only see new msgs, do: o;-50 or shorter yet: q;-50
Function: /,B,E,G,H,K,N,O,P,Q,R,S,T,U,V,W,X,#
(OR ? IF NOT KNOWN)?
```

Figure B. Ward and Randy's BBS Quick Help Screen

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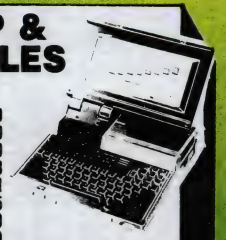

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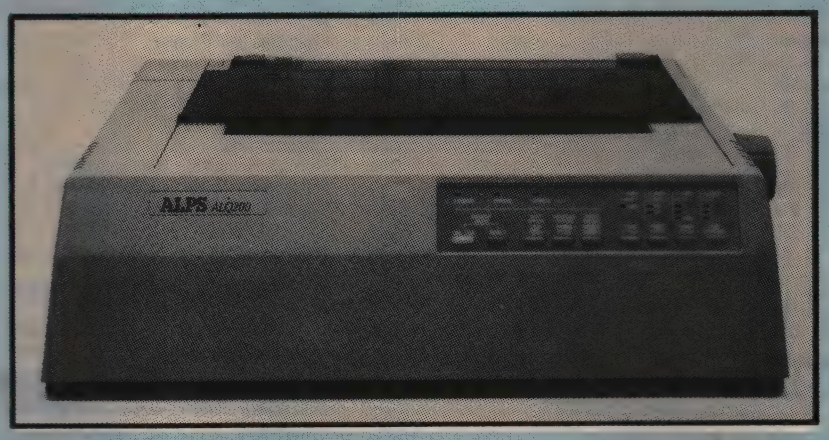

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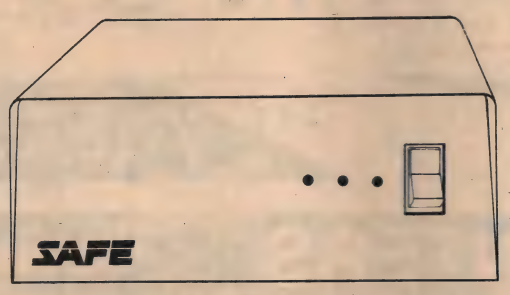

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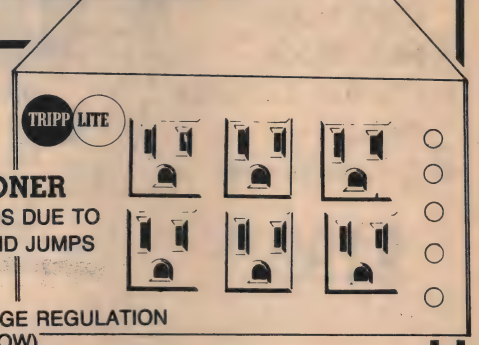

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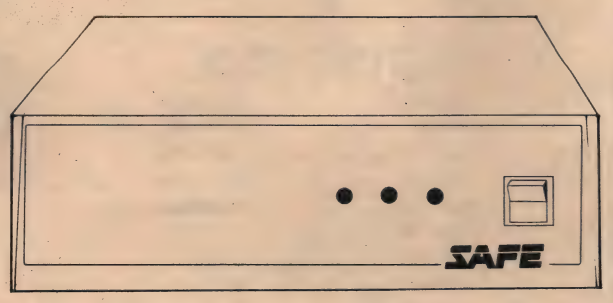

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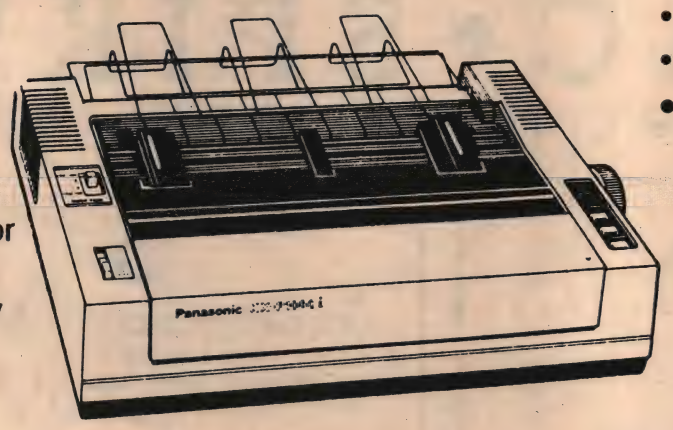

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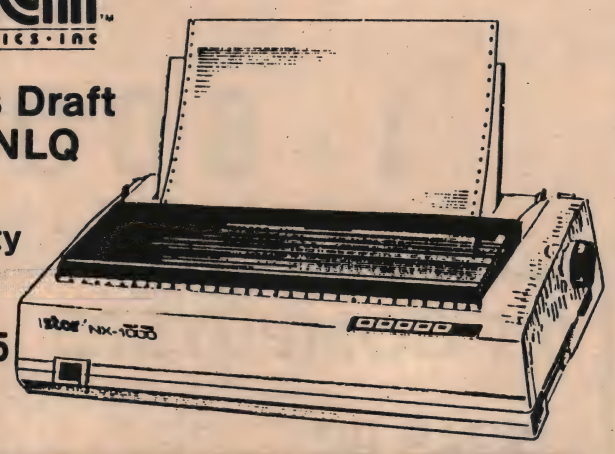

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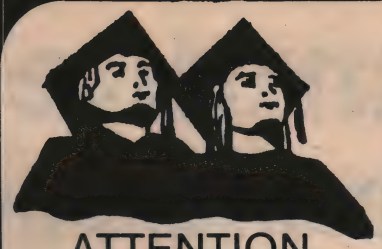

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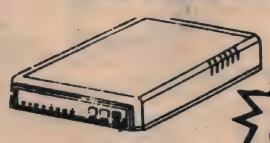

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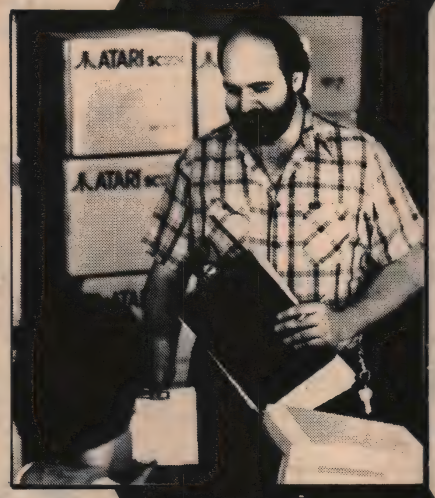

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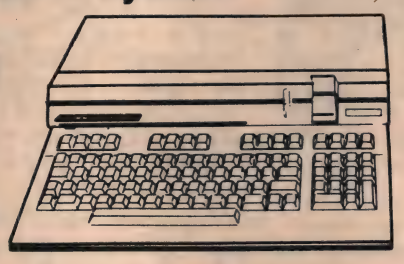

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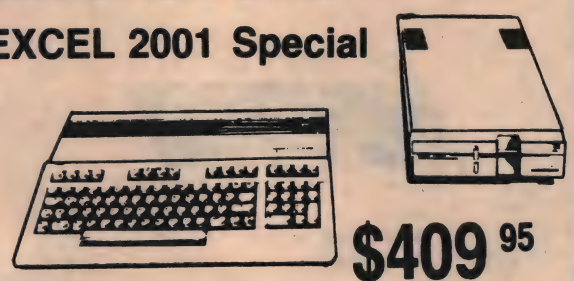

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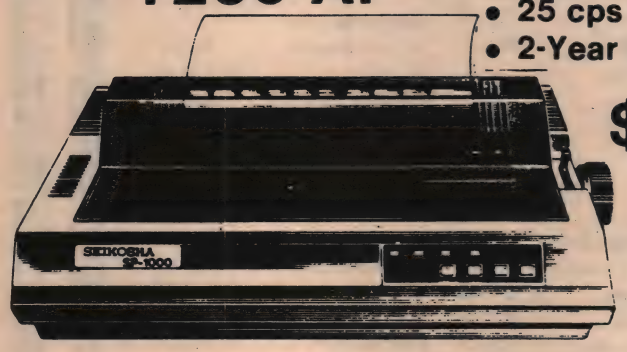

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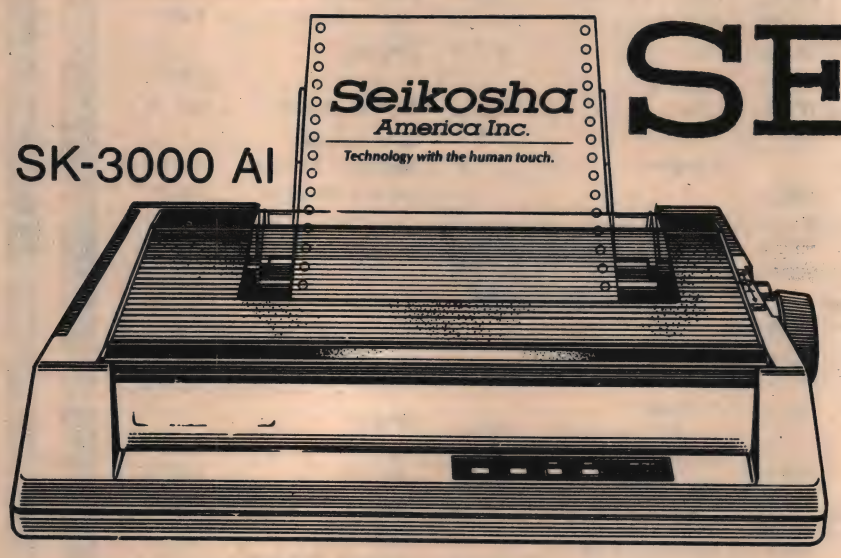

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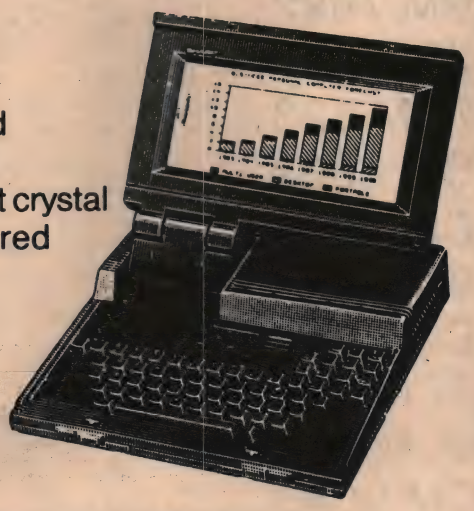

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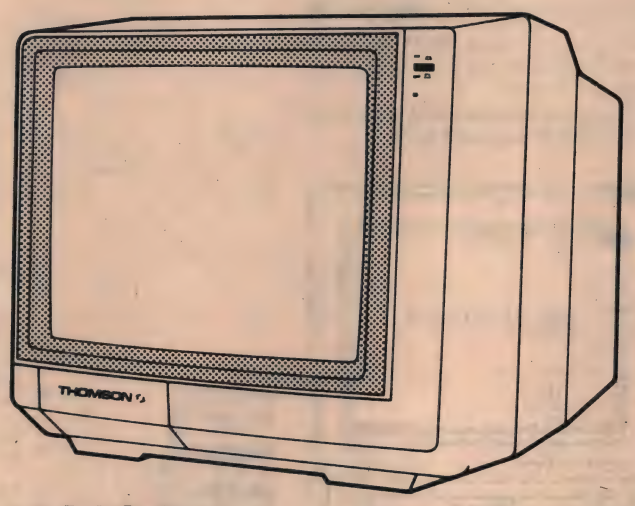

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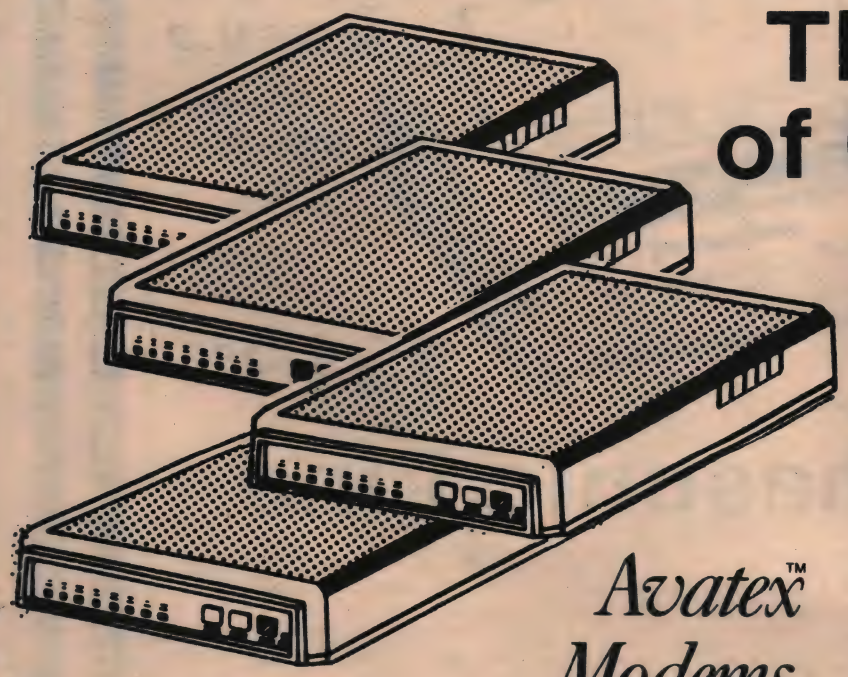

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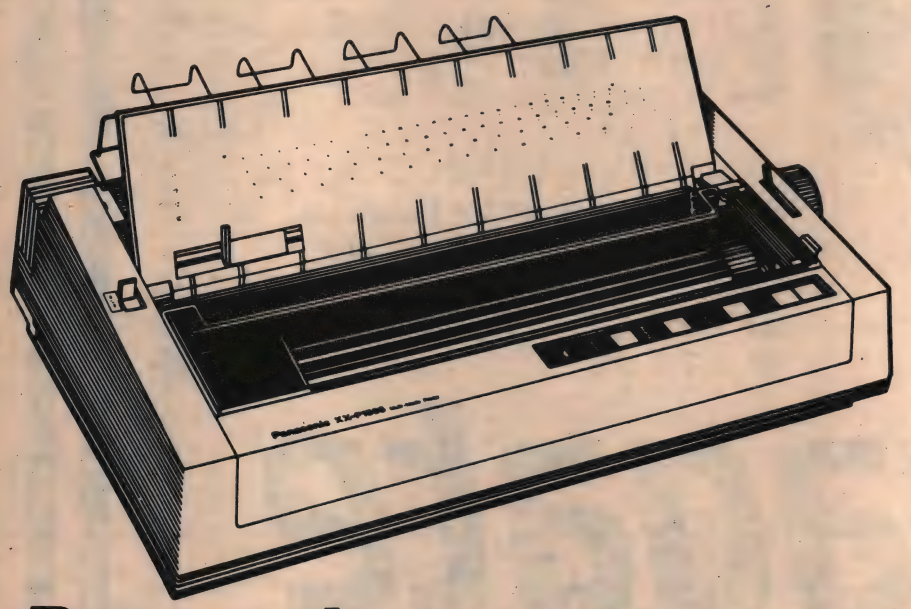
Panasonic Office Automation OA

KX-P1524



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- High speed printing up to 240 cps - draft
- Automatic "memo load"
- Front card slot
- Rush tractor
- Two year limited warranty

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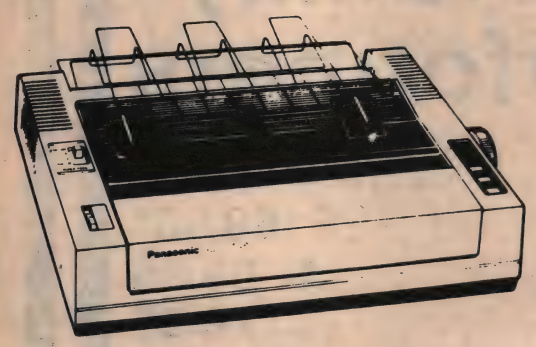
Panasonic Office Automation OA

1080i *Model II*

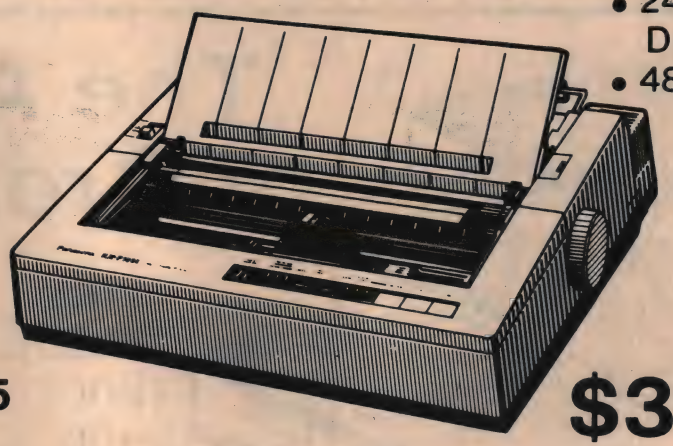


- 120 cps
- NLQ Mode
- 2-Year warranty

$179.95

Panasonic Office Automation OA

1092I



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- 48 CPS NLQ

2-Year Warranty

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- 36 cps NLQ

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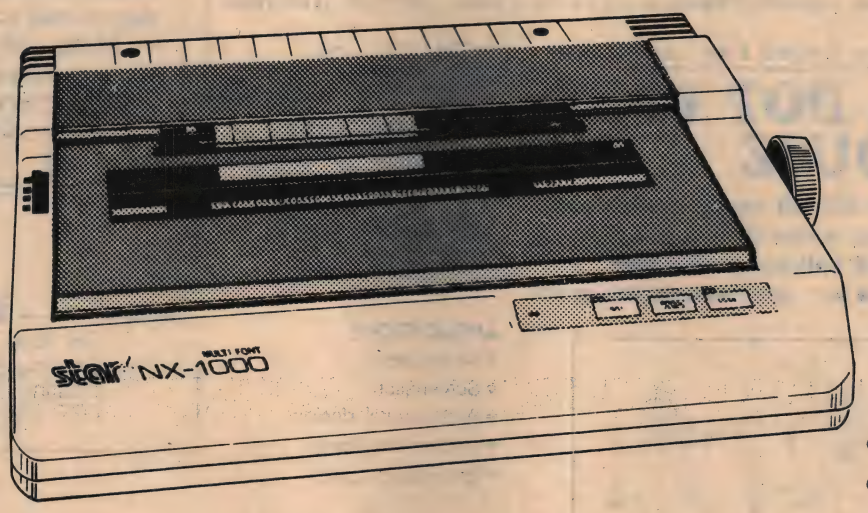

NX-1000 Rainbow
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- 36 cps NLQ

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- C-64 Direct Connect
- 144 cps Draft

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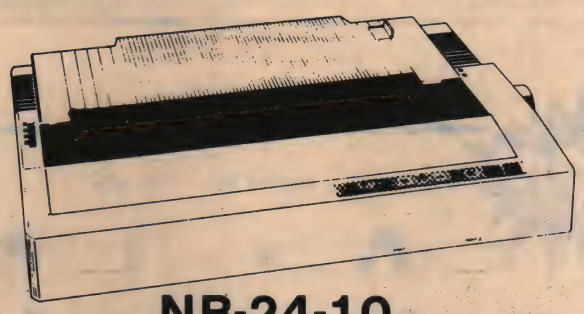

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- 180 cps Draft
- 60 NLQ
- 1-year warranty
- High quality print head

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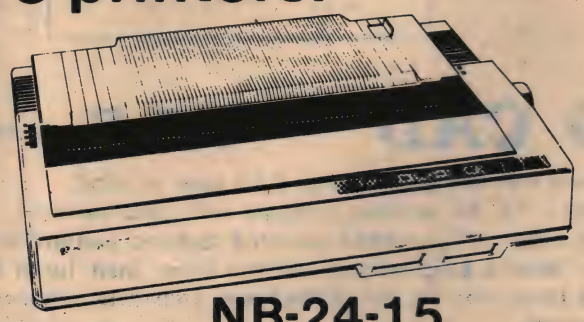

NB-24-15
- 180 cps Draft
- 60 NLQ
- Wide carriage
- High quality print head

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THE STAR PRINTER LINE

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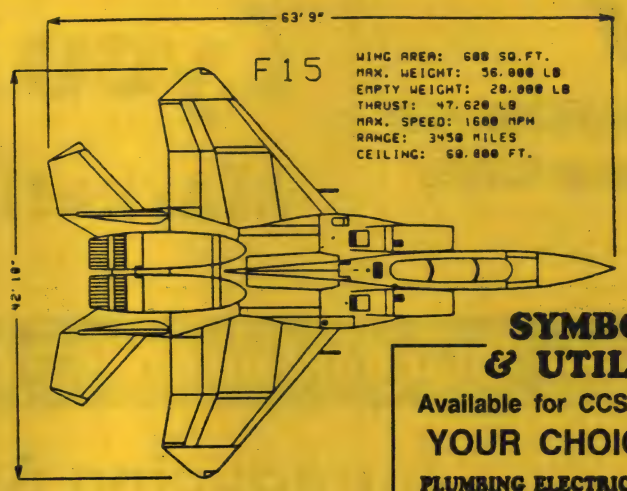

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- Schematics
- Organizational charts
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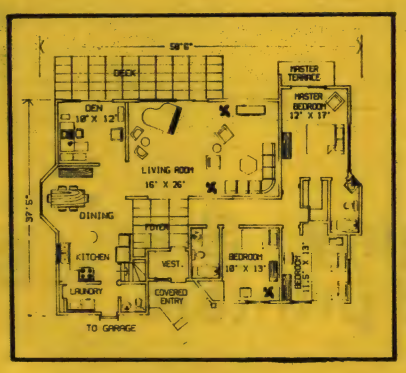

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- Schematics
- Architectural design
- Mechanical design
- Business graphics

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Drafting Enhancement 1	$ 39.95
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- DXF conversion included

APPLICATIONS
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- Engineering design
- Mechanical design

INCREDIBLE VALUE!
THIS PACKAGE INCLUDES
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- Autodimensioning
- Cross hatching
- Fileting, snaps
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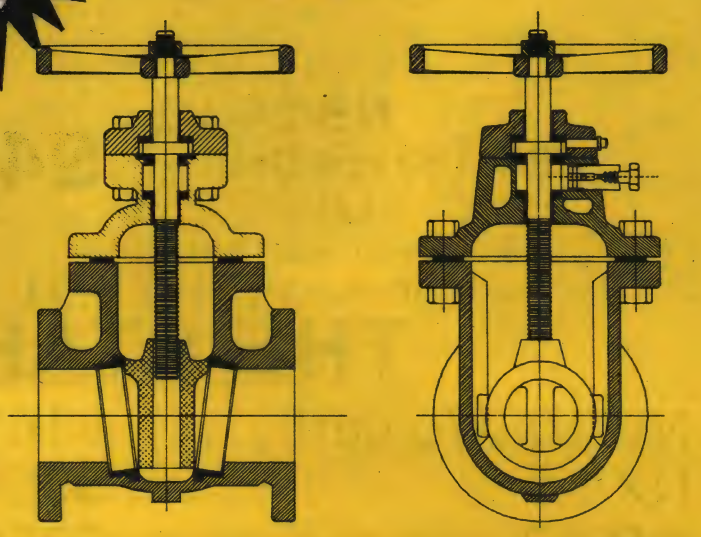
- Turbo CAD Genius Mouse+, Dr. Halo III — $169.95 ($337.95 retail)
- Turbo CAD & Trackball — $179 ($249 retail)

created with Turbo CAD



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- Microsoft compatible driver software

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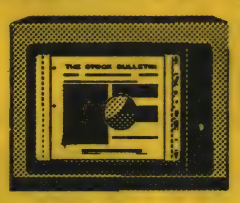

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Editorial

By Stan Veit

Welcome Ziff Davis

Five years ago I left Ziff Davis headquarters at One Park Avenue in New York City for the last time and came to Titusville, Florida to become Editor-in-Chief of *Computer Shopper* magazine. I resigned from *Computers & Electronics* magazine because Glenn Patch had given me an opportunity that few editors could resist. It was the chance to mold a publication into my vision of what a general purpose computer magazine should be. At that time *Computer Shopper* was a tabloid sized publication printed on yellow newsprint. It had lots of classified ads, some display ads and a few columns of information such as my "Veit On Computers" and Greg Squire's reviews, mostly of TRS-80 software.

The first change I made was to establish sections for each type of computer and to add the User Group and BBS listings. Once I had provided the space, we started to get contributions from writers all over the country. Glenn Patch believed in keeping advertising rates low so we could not afford to pay much for articles, but we did pay promptly and to a lot of freelancers that was important. Since we had no ads from manufacturers we were beholden to no one and could say what we really thought about products. The readers liked that and our frank open discussions on computer topics became part of the *Computer Shopper* style. We tried to help our readers as much as possible and we published their complaints as well as our answers. In a larger sense the editorial columns in *Computer Shopper* belong to the people who read it and those who write for it. We try to be as responsive to their wants and needs as possible. However, it is the responsibility of the editors to lead and to present information that our readers do not have. I think we do a good job, though our opinions are not always popular with all our readers.

The *Computer Shopper* staff and management have always been like a family and we have had our conflicts and our happy times, but we have always pulled the same oar with all our might.

We must have been doing something right, because over the years, *Computer Shopper* has grown. We got rid of the yellow paper, got illustrative covers, got some slick pages—we grew some more. We became the leading advertising medium for computer mail order sales because our readers were buyers, not responders. After five years of growth we could claim to be "The World's Biggest Computer Magazine," and few would challenge that claim.

At this point, our company reached the point where it needed the resources of a large publishing corporation. Glenn Patch, our Chairman received many offers to buy our magazine. He could have sold us to one of the many hopeful buyers who made him lucrative offers, but instead he formed a partnership with Ziff Davis covering *Computer Shopper, PC Clones* and *MAC WEEK*. This partnership leaves *Computer Shopper* with the same staff and management as before, but provides us with resources that only a large company can support. The result will be a better publication for you and for our advertisers.

We will become much more visible in all the places where Ziff Davis magazines are found (which is everywhere!). We will be able to use the tests and benchmarks developed in PC Labs and MAC User Labs, although our reviews will still be written by the same independent authors and testers. Through the research provided by Ziff Davis we will learn more about the needs and wants of you, our readers. The possibilities of this partnership are still to be explored by the staffs of both partners, but we are already seeing positive results. So I say "Welcome Ziff Davis to Titusville and *Computer Shopper*." I am glad I left New York to come here five years ago and I am glad to be a member of your team again.

It's Best Buy Time Again!

Here in Titusville, Florida the flowers start to bloom in February so it's much harder to realize when spring is here! There are several sure signs of that favorite season at *Computer Shopper*. One sign is the start of volleyball practice and the building of our raft for the Great Indian River Festival and Raft Race. The second sure sign is the start of *Computer Shopper's* Best Buy Awards.

It's that time of the year again. Time to start thinking about the *Computer Shopper* Best Buy Awards and Sweepstakes. Starting with the next issue we will bind-in the ballot for our readers part in the selection to determine the winners of the coveted Best Buy Awards with the right to display the Best Buy logo in their advertising. Please remove your ballot and keep it handy so that you can make your selection, mark the ballot and send it in. Your vote is important in the selection process and to encourage it we will select the Sweepstakes winners by drawing them from the ballots received. Winners of the Best Buy Awards will be announced in the issue following Comdex.

Last year we sent all the Sweepstakes winners of the software prizes PC software packages. Sorry, we should have known better. It took a while to get the correct packages to the software winners. We won't make the same mistake again, so please indicate the kind of computer you use in the place provided on the ballot.

Enter the Sweepstakes, vote for the Best Buy.

The West Coast Computer Faire Re-Visited 1988

The West Coast Computer Faire has always been my favorite computer show. This is the show that started Apple Computer, Alpha Micro Computer, Cromemco, North Star and countless other start-up companies. It was an incubator for ideas and small companies who had a new product, be it hardware or software. This was the place that the small start-up enterprise could afford to come to and get noticed.

It was also the "Gathering of The Computer Clan," the place where everybody knew each other. Jim Warren on roller skates was the symbol of this show and the force that kept it all together.

A few years ago Jim sold the show, and then it was sold again to the Interface Group, the same company that produces Comdex. They have tried very hard over the years to keep the spirit of the Faire, but it has gone away. Perhaps it is the multitude of small local area shows that sap the strength of the larger shows, perhaps it is just that the industry is too mature for such shows as the Faire used to be. It does seem like everyone but me is getting older. The big manufacturers are gone. Apple, Atari and Commodore are business minded and no longer wish to pay attention to the people who made them what they are today. There are fewer small start-up ventures, it takes too much money to get into the game these days. IBM was at the show as was Kaypro. The networks, GEnie and CompuServe were also there, so were lots of people, but not quite the same crowd who used to come to the West Coast Computer Faire. They were families and average computer users, not the hacker tribe at all. Perhaps this is better for business but it is not as much fun as it used to be.

Interface Group presented a panel of old time Gurus and of course the traditional "World According to Jerry Pournelle" seminar. However, the theme seemed to be "Computers are good, things are great and are going to get better." The only thing that stirred things up a bit was the universal disapproval of Apple's lawsuit. Buttons were passed out that showed a snake with dripping fangs emerging from a multi-colored apple. It bore the legend, "Get Your Lawyers Off My Computer." A rather mild protest I thought.

Computer Shopper turned out to be the only major national computer publication to exhibit at the show, although the Show Advisory Board listed names of editors from all the major magazines. Next year we will skip this one, it is no longer worth coming 3,000 miles for. ●

11th World Computer Congress—First Call For Papers

IFIP, the International Federation for Information Processing, has released the First Call for papers for next year's 11th World Computer Congress. This Congress, the eleventh in a series of triennial meetings held at locations around the world, is the first in North America since 1977. The 11th World Computer Congress (IFIP Congress '89) will be held in San Francisco, California, August 28—September 1, 1989.

The Program Committee is directed by Herve Gallaire from ECRC in Munich. The Organizing Committee for the 11th World Computer Congress is chaired by Prof. Stephen S. Yau of Northwestern University, past president of AFIPS.

The program is divided into eleven tracks with each track organized as a miniature conference featuring invited speakers, contributed papers and panelists from around the world. Each track examines a technical area from a variety of perspectives ranging from fundamental research problems to social concerns.

Final papers are due on November 1, 1988. Papers should be from 3700 to 4500 words long, must be written in English, the official language of IFIP Congresses, and will be reviewed by the Program committee for significance, originality and clarity of thought. Authors will be notified of acceptance or rejection of papers by February 15, 1989.

The IFIP Congress is the single most important worldwide meeting allowing computer scientists, researchers and practitioners to exchange ideas and report their results on a multiplicity of topics. IFIP is an international organization based in Geneva, Switzerland, with 44 nations and regional associations as full members.

For further details regarding the program, please contact: Herve Gallaire, ECRC, Arabellastrasse 17, D-8000 Munich 81, Federal Republic of Germany; Tel: 49-89-92 69 91 00; Fax: 49-89-92 69 91 70; Telex: 5216910; e-mail: mcvax!unido!ecrcvax!ifip. ●

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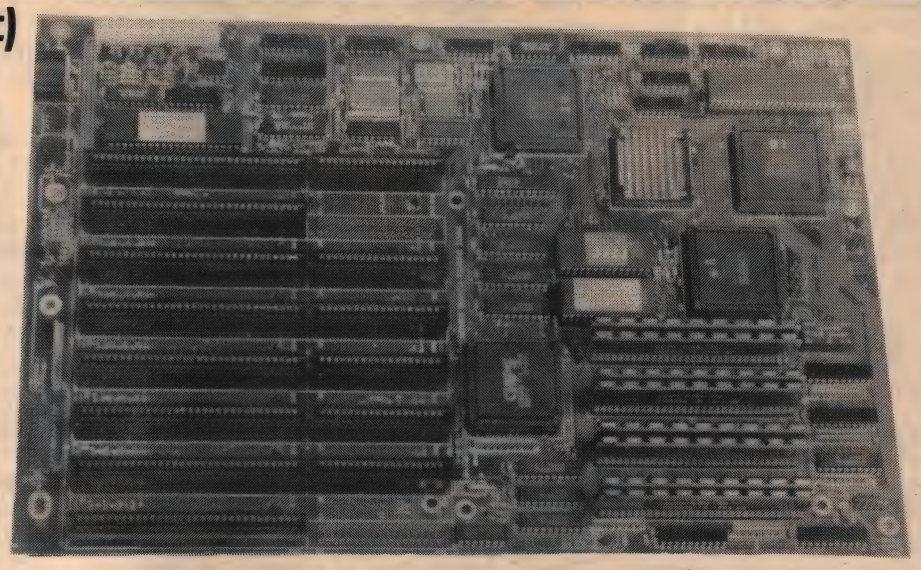

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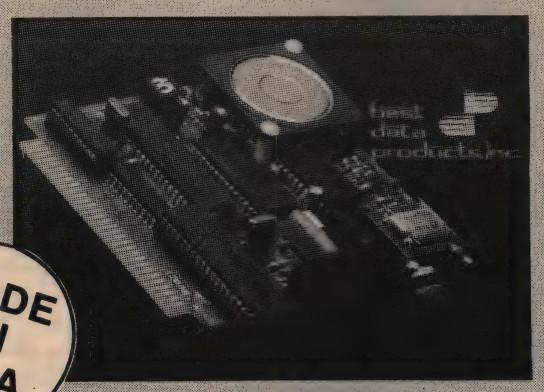

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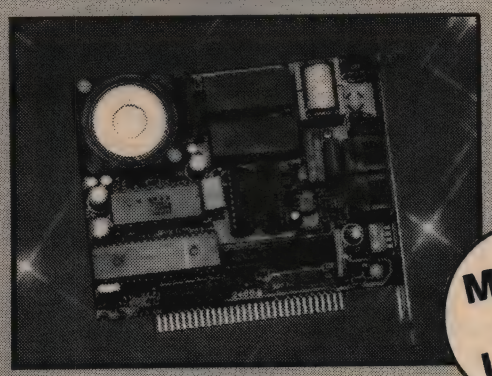

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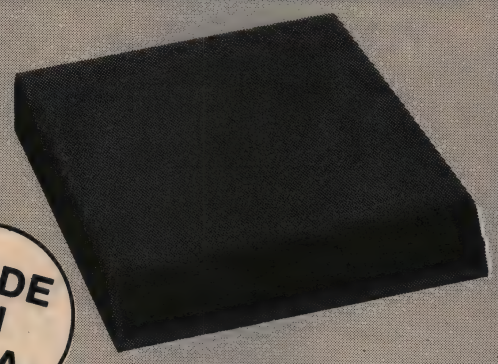

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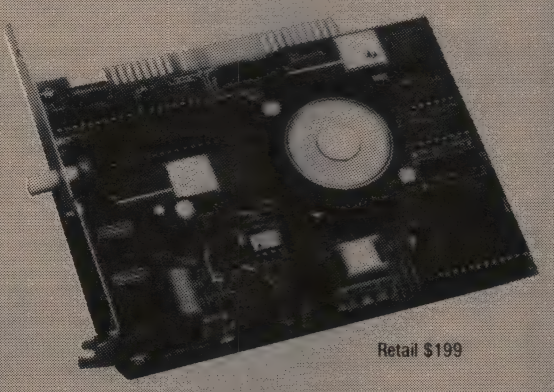

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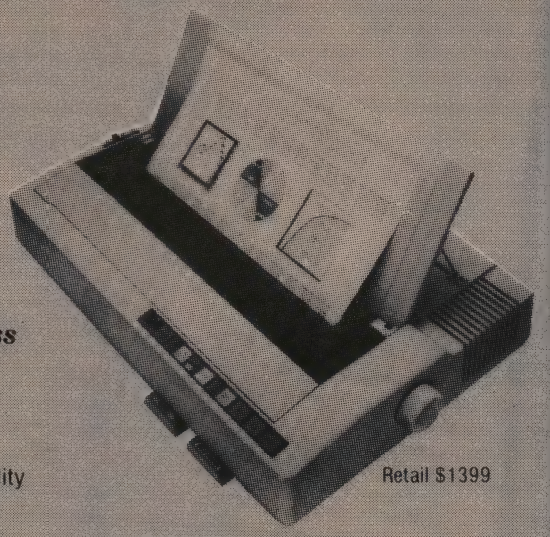

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"Notices of availability of GEM/3 are being mailed to all of our registered users of GEM presentation and publication graphics applications, for easy upgrade," stated Dick Williams. "We're also notifying our OEM customers, and we're working with our Digital Research Authorized Dealers to ensure they have the product information they need to demonstrate now the benefits of these GEM/3 enhancements to users and developers of GEM applications." ●

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Ten Years Of BBSing
continued from page 86

2. R—Use R function to retrieve messages of interest, IF you missed them with the "hit return" flagging above.
3. G—Use the G (Good bye) function when you are done. (You will be able to leave comments at this time.)

= = > Use H command if you need help.

NOTE: When you receive the line: FUNCTION: (A,B,C,D,E,G.....) (OR ? IF NOT KNOWN)?
--> Please reply ? the first time so you learn of all the functions available.

The following is a list of all the CBBS keywords and a brief explanation. Where there is no explanation, the keyword is considered self explanatory.

HISTORY = history of changes to the help file

KEYWORDS = alphabetized list of keywords in this help facility

KEYWORD =

FULL = Full line edit functions

PRINT = We don't know how to print CBBS output on YOUR computer!

MINE = Info on "MINE" command. The command "mine" attempts to find message TO

PARITY = CBBS does not set or test parity.

COMMANDS = Help with CBBS commands

MAIN =

INFO =

MENU = CBBS command menus

MESSAGES = Overview of same

USER = CBBS REMEMBERING ITS USERS

* = PREVIOUS HIGH MSG #.

U = User command. The U command records the settings of the following

NULL = what is a null

GAMES = Games on CBBS? no.

- = use of "-"

LINEFEEDS = CBBS always sends linefeeds

C/R = means the "Carriage Return" key on your keyboard

SHORT = Shorten CBBS output by suppressing some characters

LONG = Un-do what was done by SHORT command:

BRIEF = shorten the output CBBS sends you (see also X <expert user>)

NEXT = What will the next message number be

= What does the # command do

MARK = Info on marked msgs

NEW = How does new user get help (or "what's new?")

MAIL = Sorry, there are no "mailboxes" on CBBS.

FUNCTIONS = Misc. details about CBBS functions

HELP = "New user" help function

H = Keyword-oriented help

CTL CHRS = Help with system control characters.

^ C = Cancel CBBS output

^ E = Send carriage return/Linefeed to your terminal.

^ H = Backspace to correct typing errors.

^ K = Kill out of current function.

^ L = Find how long an input field is.

^ N = Send 5 more NULLS.

^ R = Re-show line.

^ S = Suspend output from CBBS

^ W = Word backspace.

^ X = Line backspace.

HEADLINES =

NEWS = The CBBS NEWS function

C = Case change command (upper/lower).

CASE = changing CBBS between upper-only, and upper-lower case.

ENTER = Help with entering a message into system.

MESSAGE = How to enter one (see "R" for how to retrieve)

E = Message entry function

INPUT = How to input a message to CBBS

ESUB = Edit function subcommands

UPDATE = Update a message you previously entered.

EDIT = Editing a message

LEAVE = see "E" to leave a msg, "G" to leave the system

KILL =

DELETE =

ERASE = Help on killing (Erasing) messages. (Use K function)

K = Kill function

SUMMARY = Help with system summary function.

O = One-line Summary command

S = Summary command

Q = Quick summary command

SR = Summary command with auto retrieve

QR = Quick summary command with auto retrieve

QUICK = Help with system summary functions.

FIND = Finding users, finding messages

SEARCH = Help with searching summaries for content.

FIND-MESSAGE = Find message with certain contents or from or to.

SCAN = Scan messages for content

BOOLEAN = Doing "and," "or" and "not" while searching.

NOT = searching for summaries NOT containing such-and-such

AND = using "and" to search messages

OR = using "or" to search messages

RETRIEVE = Help with retrieving messages.

RETREIVE = Misspelling of "RETRIEVE"

READ = read a message

R = The retrieve function.

FLAG = Flag msgs for retrieval while summary types

F = Press "F" during summary to flag for retrieval

M = Press "M" during Q/S summary to flag ones you missed

STOP = Stop CBBS

END =

EXIT =

OFF =

LOGOFF =

QUIT =

GOODBYE = How to sign off the system.

G = The GOODBYE function.

/ = CBBS Quick good-bye command

BYT = Leaving CBBS.

COMMENTS = Leaving comments about CBBS without entering a msg.

NULLS = Help with system sending nulls.

N = The Nulls function.

PHONE = where to find operators phone numbers

BULLETIN = Help with retrieving Bulletin and Welcome messages.

B = Bulletin reprint function.

WELCOME = Help with retrieving Bulletin and Welcome messages.

W = Welcome reprint function.

DUPLEX = Help with system character echoing features.

D = The Duplex (Echo) function.

ECHO = Help with system character echoing features.

DOUBLE = Is your terminal typing every character twice?

BELL = Help with system Prompt (bell on/off) function.

PROMPT = Help with system Prompt (bell on/off) function.

P = The prompt (bell) function

EXPERT = Help with eXpert users mode.

X = The expert mode function

USE = Help with using system efficiently.

VIDEO = Help with video backspace function.

BACKSPACE = Help with video backspace function.

V = Video backspace mode function.

TAB = Use of control-I (TAB) characters.

FILES = Some information about CBBS file usage

SOFTWARE = What software drives CBBS.

FLIP = CBBS does not support flipping to answer mode on our modem.

FIND-USER = Using FIND to find another user.

SIGNON = Info about signing on to CBBS

STAT = Determines disk storage

OTHER = info on other dial-in systems: see msgs 12-16

CPM =

DOWNLOAD = No file xfers here.

XMODEM = file transfers here? No.

CP/M = CBBS doesn't allow access to CP/M

HARDWARE = What hardware makes up this system

SALE =

SELL = How to sell something via CBBS; Do we sell CBBS?

CLUB = Club news on CBBS

CLUBS =

CBBS = What is CBBS

OVERVIEW = Overview of CBBS

PASSWORD = Help with protecting messages with password.

MODEM = CBBS uses a UDS modem, doesn't support MODEM file transfers.

NEWBAUD =

ALTER =

BAUD =

1200 BAUD = Now available

SPEED = Help with altering system baud rate.

A = The Alter baud rate function.

TIME = Description of system Time function.

T = The Time function.

OPERATOR =

OPERATORS = Who runs this CBBS.

WHY = Why does CBBS exist.

CHAT = operator chat facility on CBBS.

Your comments and suggestions are welcome. I especially would like to hear your suggestions for BBS Of The Month. You can contact me at P.O. Box 678, Garner, NC 27529, or by computer on Delphi (CURTPHIL), CompuServe (73167,2050) or the Source (BDK887). ●

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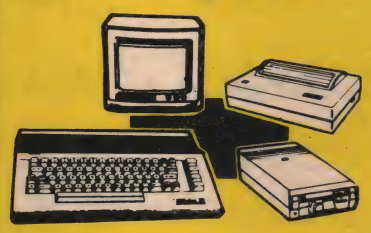

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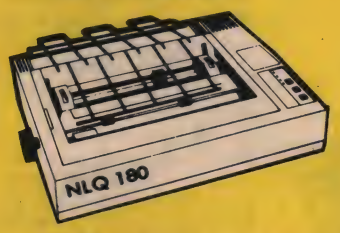

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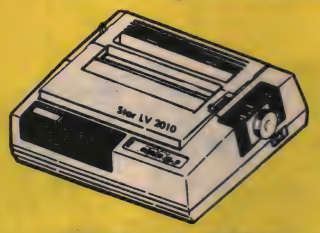

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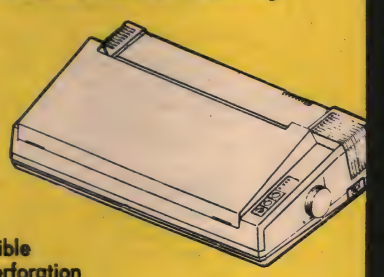

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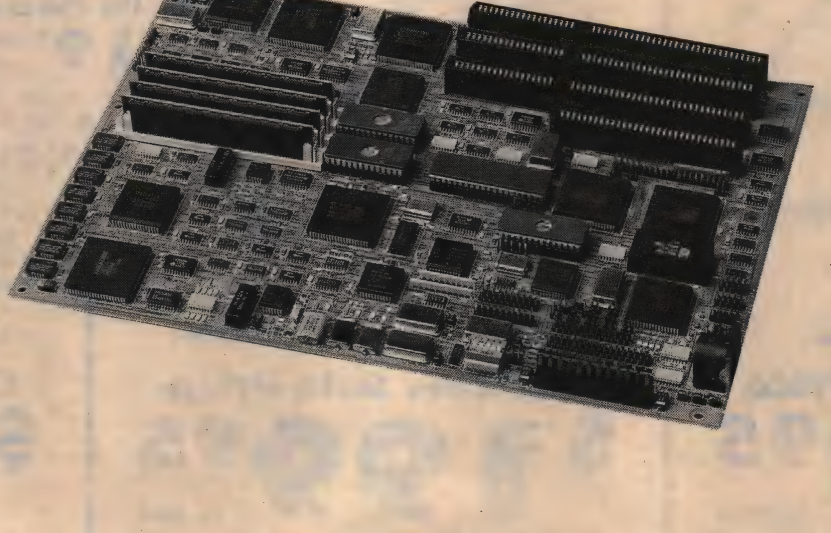

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Networks For The Little Guy

by Wally Wang

Take a typical office consisting of five IBM PCs, one 40 megabyte hard disk, and one Hewlett-Packard laser printer. Add up the costs, assuming the cost of a PC compatible computer as $1,000, the hard disk as $500, and the laser printer as $2,000. Such a configuration costs $7,500.

Now let's say the office manager wants to network these five computers together for sharing database files and giving every computer access to the laser printer. The manager would need five network expansion boards (one in each computer), a server computer dedicated to running the network, and software for running the network.

Estimating the cost of network boards at $500 each, the server computer at $2,500 (for an 80286 or 80386 computer), and network software at $2000, the cost for a network equals $7,000 or over 90% of the investment of the original computer system. The cost alone stops many businesses from buying a network. In addition, consider hidden costs such as network installation, training, and maintenance. Given these circumstances, is it any wonder that less than 3% of all personal computers in the workplace are connected in networks?

That may soon change. While many manufacturers have designed networks based on the old idea of distributing information through multiple terminals connected to a central computer, a new generation of networks has arrived for distributing information between personal computers.

Dubbed as "office connectivity" solutions, these networks provide features required in the typical office. One person might want to access a database file off another computer's hard disk while someone else across the room may need to print a document on a laser printer. In situations like this, the advanced features of the more sophisticated networks are completely unnecessary.

An office connectivity network provides networking at a minimal cost because they use less complicated hardware and software. In comparison, the more sophisticated networks often require a dedicated server computer to run the network. The dedicated server must be an 80286 or 80386 class machine and cannot be used as a separate workstation itself without degrading the responsiveness of the entire network.

Office connectivity networks do not require a dedicated server; any computer can be used as both a server and a workstation. Several computers on the network may even share the tasks of a network server, preventing the entire network from failing if the server computer should fail.

One of the most expensive parts of a network are the network expansion boards. Every time you add a computer to the network, you have to buy another network board. Office connectivity networks solve this problem by using specially designed network boards or eliminating the need for network boards altogether.

LANLink, by The Software Link Inc., eliminates the need for special network boards by using each computer's serial port instead. This approach simplifies installation, eliminates the need for an open expansion slot in each computer which further reduces the cost for the network.

Cost and installation may be important when shopping for a network, but speed and performance will be more crucial when using the network. Direct comparisons of networks may show speed advantages up to three times faster in favor of the more sophisticated networks. But numbers only tell half the story.

Transmission speeds measure the optimum speed of a network, not the actual speed under ordinary use. In ordinary use, a network spends much of its time communicating with other computers in the network to initiate or acknowledge receipt of a message. No matter how fast it transfers files, a net-

continued on page 140

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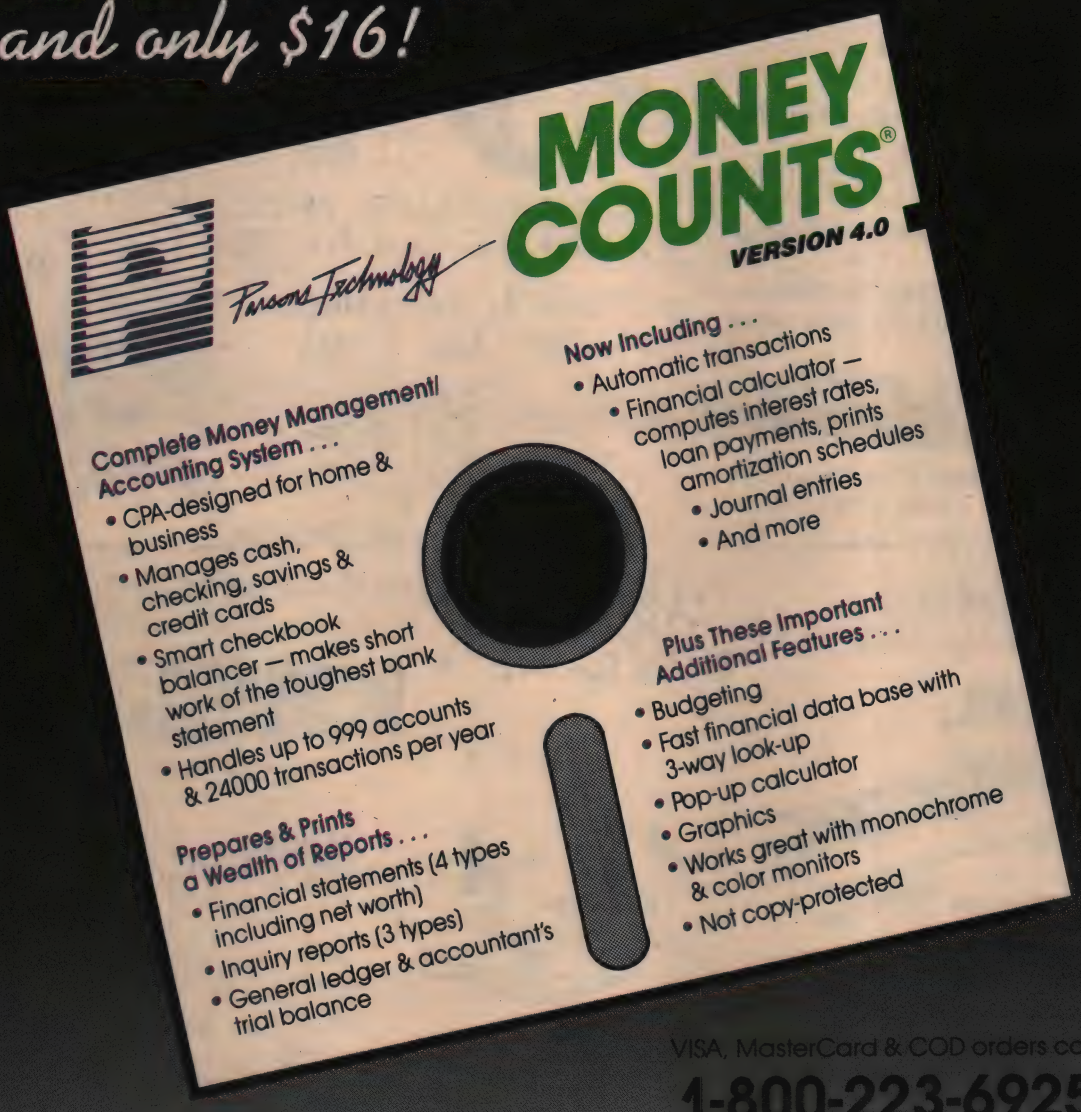
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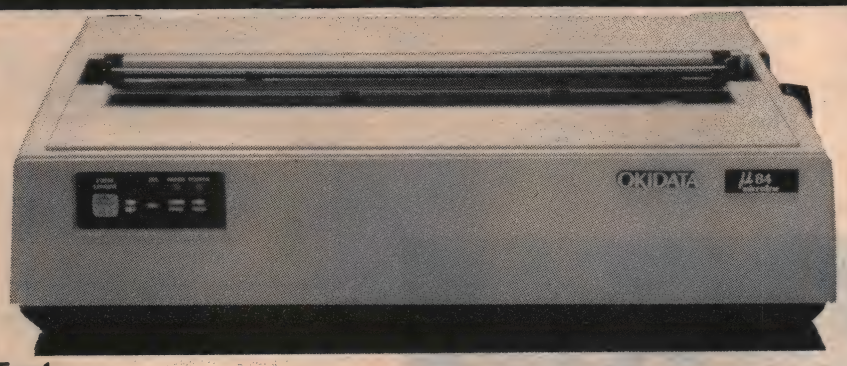

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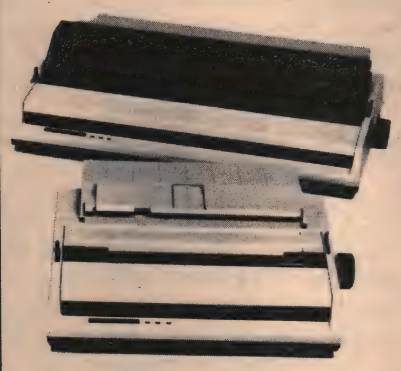

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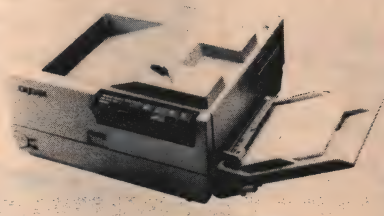

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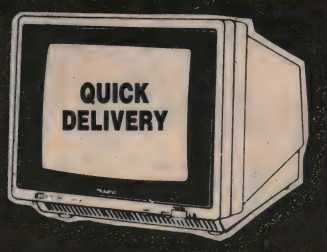

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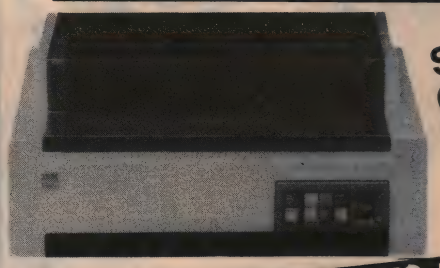

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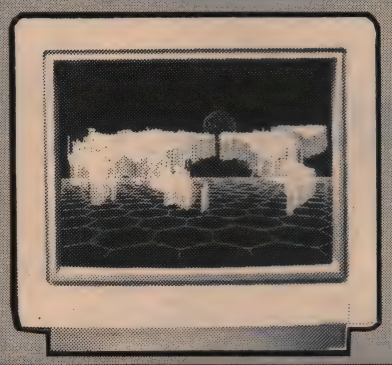

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- 2 I.C. card slots
- Includes manufacturer's 90 day parts & labor warranty

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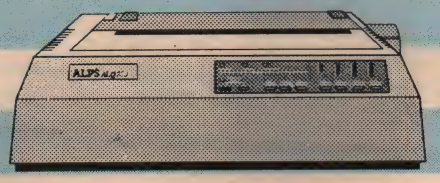
ALQ 218



Features:
- Full color dot matrix printer
- 240 cps draft/120 cps correspondence/ 80 cps letter quality
- optional snap in/out 24-pin print head
- Easy front panel control

LIST PRICE: $595

PRINTERS PLUS PRICE:

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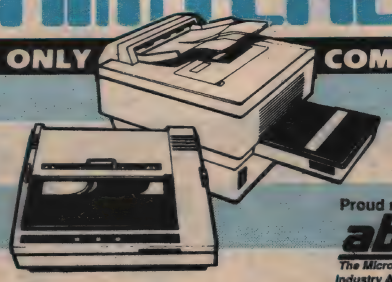

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Phone (513) 368-2309

Dear Computer User,

Star's SR-10 and SR-15 printers are high speed business printers that work as fast as you do. The 200 cps print speed and high quality output will keep your work flow at peak performance. You can print correspondence, reports, graphic presentations and spreadsheets quickly and easily. When your turn-around time is short and volume level high, Star's SR-10 or wide carriage SR-15 printer is a perfect solution.

We are pleased to offer these sophisticated, high-speed printers at a price that won't break the bank! Now you can have a 200 cps, full-featured printer for much less than you'd normally expect to pay. You'll never pay too much at MidWest Micro. The SR-10 and SR-15 assure exceptional cost efficiency without compromise in quality.

The SR-10 and SR-15 are fully compatible with your IBM PC and compatibles. The tractor feed is built-in for heavy duty use and the printers even have a short-form tear off to accommodate your forms printing needs. They produce high resolution graphics to ensure a great look when you make crucial business presentations.

Give us a call today and put the Star SR-10 and SR-15 to work for you. You'll discover how easy high-speed printing can be.

Sincerely,

Mark Runkle

Mark L. Runkle
President

P.S. – When you need a high-speed, high quality business printer Star's SR printers are a perfect solution.

200 - 240 CPS – High Quality . . .

Star SR-10
10", 80 Column

Your Price
$~~239~~ *Even Less*

Star SR-15
15", 136 Column

Your Price
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Retail: SR-10 - $679; SR-15 - $799
(SR-10 Pictured)

- Fast 200 CPS Draft/50 CPS NLQ
- IBM Compatible
- 2K Print Buffer, SR-10; 16K, SR-15
- Parallel Interface
- Both Friction and Tractor Feeds
- Short Form Tear-Off
- High Resolution Graphics
- Front Panel Control
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- Original +2 Copy Capacity
- One Year Manufacturer's Warranty

Complete Star Line . . .

		Retail	Sale
NX-10	120 CPS + NLQ, Epson/IBM Compatible	$349	~~$169~~
NX-10C	Commodore Compatible	349	~~179~~
NX-1000	NEW Multi-Font Selection, 144 CPS, 4K, Paper Parking	299	~~178~~
NX-1000C	Commodore Compatible	299	~~179~~
NX-1000CL	Prints 7 Colors	379	~~249~~
LV-1215	120 CPS, IBM Compatible, 136 Column	499	~~199~~
LV-1615	160 CPS, IBM Compatible, 16K, 136 Column	699	~~239~~
LV-2015	200 CPS, IBM Compatible, 16K, 136 Column	799	~~209~~
SD-10	160 CPS, IBM/Apple Comp., Parallel Interface	599	~~219~~
SD-15	160 CPS, IBM/Apple Comp., 15" Carriage	749	~~248~~

		Retail	Sale
SR-10	200 CPS, IBM Compatible, Parallel Interface	679	~~239~~
SR-15	200 CPS, IBM Compatible, 15" Carriage	799	~~299~~
NX-15	120 CPS + NLQ, Epson/IBM Comp., 15" Carriage	529	~~319~~
NR-10	240 CPS, Epson/IBM Comp., 12.6K Print Buffer	579	~~339~~
NR-15	240 CPS, Epson/IBM Comp., 12.6K, 15" Carriage	799	~~429~~
NB24-10	24-Pin, 180 CPS, Epson/IBM Compatible, 8K	749	~~449~~
NB24-15	24-Pin, 180 CPS, Epson/IBM Comp., 15" Carriage	999	~~559~~
NB-15	24-Pin, 300 CPS + LQ, Epson/IBM Comp., 15" Carriage	1399	~~849~~
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Dear Friends,

Good news travels fast, but in case you haven't heard, our special deal on the Seikosha SP-1200AI has been voted Computer Shopper's 1987 "Best Buy" in the impact printer category. Thanks to all of you who voted us this special award and for recognizing the SP-1200AI as the best buy from the best source . . . MidWest Micro Peripherals.

We also want to thank Marshall Shaw and the fine people at Seikosha America who have helped us achieve this award. Seikosha America is always ready with the latest in printer technology and MidWest Micro is proud to offer exceptional buys like the SP-1200AI. And it's no small wonder that the SP-1200AI has become such a popular printer with its 120 cps print speed, Epson and IBM compatibility and quiet 52dBA operation.

Thank you for your continued support and rest assured that we won't be resting on our laurels. We'll keep coming up with great printer buys. So call our toll-free number and let us deliver the 1987 "Best Buy" SP-1200AI to your door. You'll be glad you did!

Sincerely,
Mark Runkle
Mark L. Runkle
President
MidWest Micro

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SEIKOSHA SP-1200 AI

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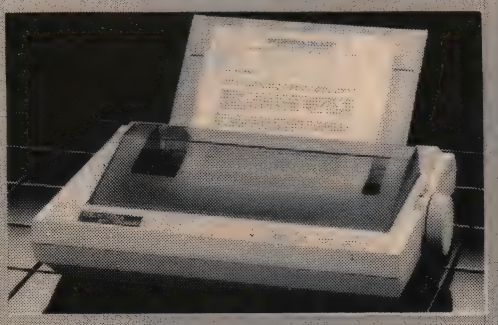
$189 (even less!)
(Leaves Epson & Panasonic in the Dust)



List $319

2 FULL YEAR WARRANTY

Features of SP-1200AI
- 9-pin, impact dot matrix printing method
- Printing speed – 120 cps (Draft) and 25 cps (NLQ)
- Multi software modes, IBM® and EPSON® modes
- Quiet operation (below 52 dBA)
- Printing styles – Double-Width, Bold, Double-Strike, Italic, Superscript/Subscript and Underlining
- 8 kinds of dot addressable graphic printing (up to 1920 dots/line)
- Automatic paper loading and ejection system
- 128 download characters
- Multi-functional push-button front switches – 6 kinds of character pitch selection, NLQ mode setting and paper feeding
- Both cut sheet and continuous fanfold paper handling capability
- Optional Automatic Cut Sheet Feeder
- Now available - SP-1200AS serial printer

SPECIFICATIONS OF SP-1200AI

Printing
Printing Method: Impact Dot Matrix Method, Bi-directional (character printing), Uni-directional (graphic printing)
Printhead: 9 pins
Print Speed: 120 cps (Draft Pica), 25 cps (NLQ Pica)
Throughput: 63 lpm (Draft Pica)
Line Feed Pitch: 1/6, 1/8, 7/72, n/72, n/144, n/216 inch
Line Feed Speed: 6.7 lines/sec. (6 lines/inch)
Character Sets: 185 characters and symbols, 49 international characters and 128 download characters
Character Attributes: Double-width, Bold, Double-Strike, Italic, Superscript/Subscript and Underlining
Acoustics: Below 52 dBA (ISO/DIS 7779)

Media Handling
Paper Weight: 15 to 22 lbs., (52 to 81 g/m^2)
Paper Width: 4 to 10 inches (fanfold and cut sheet)
Original + 2 sheets (total thickness 0.2 mm)
Paper Path: Rear
Paper Feed Method: Tractor and friction

Interfacing
Parallel: Centronics compatible
Buffer: 2.3 K-byte

Ink Ribbon
Type: Special cassette type ribbon
Color: Black

Reliability
Printhead Life (MCBF): 80 million characters
Ribbon Life: 2.5 million characters

Options
8K-byte Buffer, Automatic Cut Sheet Feeder, Multi Strike Carbon Film Ribbon

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		Sugg. Retail	Your Price
Printers			
SP-180AI	100 CPS, Epson/IBM Compatible, Parallel Interface	$249	~~$149~~
SP-1000AP	100 CPS, Apple IIc/MAC Compatible	299	~~219~~
SP-1000VC	100 CPS, Commodore Compatible, Cable Included	270	~~159~~
SP-1200AI	120 CPS, Epson/IBM Compatible	319	~~189~~
SP-1200AS	120 CPS, Epson Compatible, Serial Interface	319	~~189~~
MP-1300AI	300 CPS, Epson/IBM Comp., Ser. & Par., Color Option	599	~~299~~
MP-5300AI	300 CPS, Epson/IBM Comp., Ser. & Par., 15" Carriage	799	~~439~~
SK-3000AI	300 CPS, Epson/IBM Comp., Ser. & Par., Color Option	649	~~369~~
SK-3005AI	300 CPS, Epson/IBM Comp., Ser. & Par., 15" Carriage	849	~~489~~
BP-5420AI	420 CPS, Epson/IBM Comp., Ser. & Par., 15" Carriage	1849	~~999~~
SL-80AI	24-Pin, 10" Carriage, Epson/IBM Compatible	549	~~329~~
SBP-10AI	800 CPS, Epson/IBM Comp., 64K, Par. & Ser.	4495	$CALL$
PRINTER ACCESSORIES			
	Cut Sheet Feeder (For SP Series & SL-80AI)	155	99
	MP-1300AI Color Kit	155	119
PRINTER RIBBONS			
	SP Series Cartridge BP Series Cartridge MP Series Cartridge - Black MP-1300 Cartridge - Color		Low as **$3.95** each

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- 40 Character Command Buffer
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- Audio Speaker For Listening To Call Progress
- 2 Year Manufacturer's Warranty
- Made In The U.S.A.

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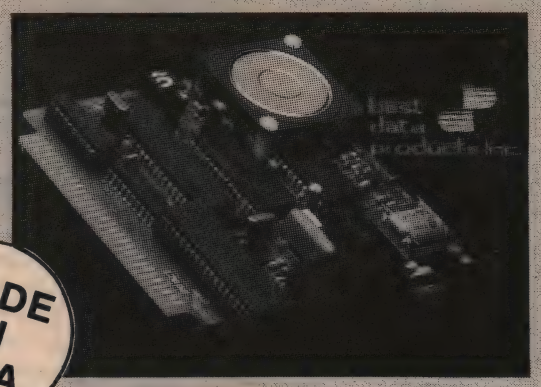
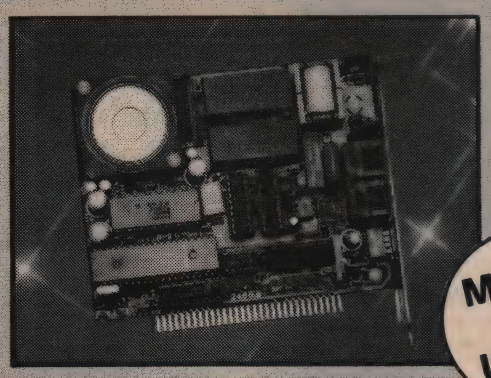


Retail $139



Retail $219

SMART ONE 2400 Baud Internal Modem

Your Price **$139** *Even Less*

For fast reliable communications your choice is the SMART ONE 2400 baud modem. You can send and receive spread sheets, data base files, graphs, etc. in the most cost efficient manner with the SMART ONE 2400 baud modem. It is fully Hayes compatible and it's made in the U.S.A. label assures you of the highest engineering standards and quality manufacturing.

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- Compatible with IBM PC, XT, AT & Compatibles
- Includes BITCOM Communication Software
- 40 Character Command Buffer
- Addressable as COM 1,2,3,4
- Detection of Dial Tone, Busy, and Ringback For Easy Call Progress Monitoring With Audio Monitor
- Full Duplex Operation
- Auto Dial/Auto or Manual Answer
- 2 year Manufacturer's Warranty
- Made In The USA

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SMART ONE™ 2400 Baud External Modem

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Your Price **$169** *Even Less*

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- 300 bps, 1200 bps and 2400 bps Data Transmission
- Compatible With IBM PC, XT, AT & Compatibles
- Includes BITCOM Communication Software
- Addressable as COM 1,2,3,4
- Auto Dial/Auto or Manual Answer
- Speaker With Volume Control
- 40 Character Command Buffer
- Full Duplex Operation
- 2 Year Manufacturer's Warranty
- Made In U.S.A.

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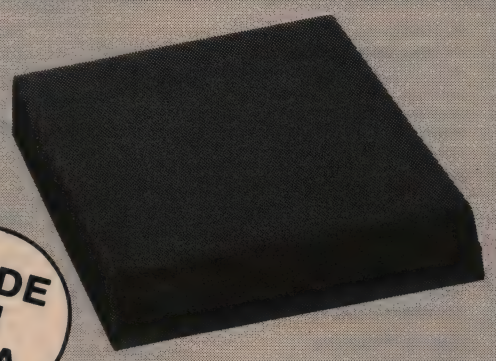

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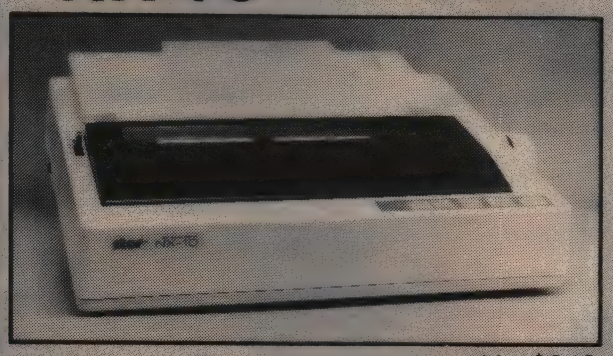

Big 5K Print Buffer

List $349

If you are looking for a top quality printer at an affordable price, you've found both in the new Star NX-10. The NX-10 operates bi-directionally at 120 CPS and includes many special features such as near letter quality printing, a huge 5K print buffer and easy access format switches for a wide range of character modes and character sets. You get friction feed for single sheets and tractor feed for fanfold paper. Another special feature is IBM graphics printer emulation.

All this makes the new NX-10 versatile enough for home or office. The NX-10 is easily interfaced with all popular computers such as IBM, Apple, Atari, Commodore, Sanyo and Zenith. Breakdowns are virtually unheard of with the NX-10. It is manufactured by a leading company with over thirty-five years of micro-precision experience for quality and reliability.

Whatever your personal computer...Star's NX-10 provides reliable and flexible performance meeting your needs today...and tomorrow.

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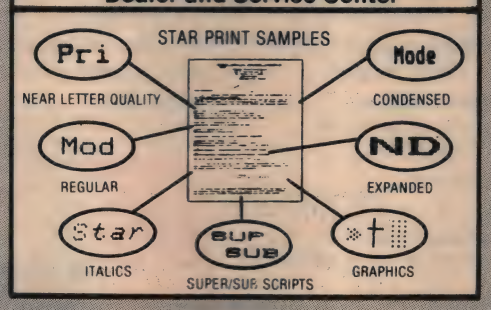

Fine Near-Letter-Quality, 100% compatibility and total reliability all in an easy-to-use printer!

NEW star NP-10 PRINTER

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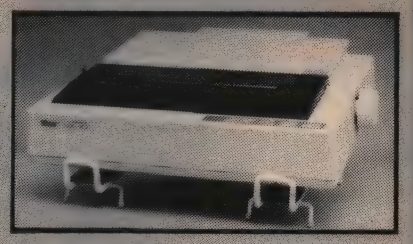
Replaces Gemini 10X and SG-10

JUST $129

EVEN LESS!

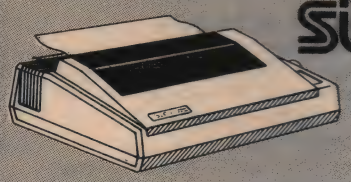


List $279

Full Featured NP-10 Printer

- **Quality Printing with Star Reliability**
- **Both Fine Near-Letter-Quality and High Speed Draft Printing**
- **Ease of Operation with Front Panel Switches**
- **Friction and Tractor Paper Feed Standard**
- **Auto Paper Feed**

For ease-of-operation, dependability and unparalleled price performance, nothing beats the New Star NP-10. You get outstanding print quality at 100 cps in draft mode and 25 cps in near-letter-quality mode. The NP-10 is ideal for small business, educational and home use with its easy front panel operation. With the NP-10 you simply touch a button on the control panel to print in either draft or near-letter-quality modes. And it only takes a flip of the paper release lever to automatically feed single sheets into the Star NP-10. Unlike other printers at this price, the NP-10 comes with an adjustable tractor as well as friction feed. Other standard features include a clean, long-life ribbon cassette, forward and reverse microfeed and a nationwide service network. It all adds up to the Star NP-10 as a great printer choice.



star NX-15

ONLY $~~319~~ Even Less

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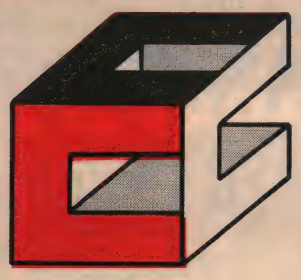

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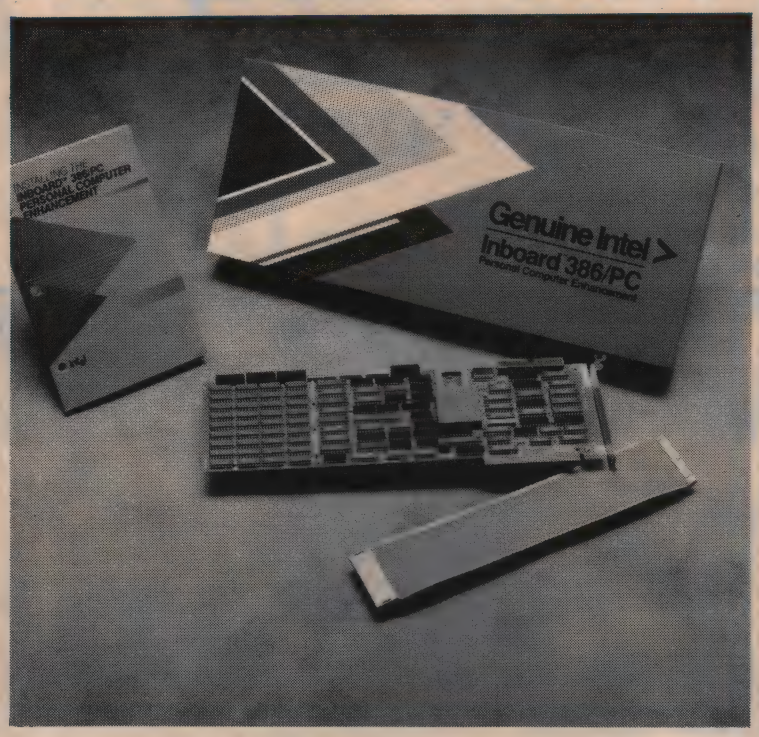

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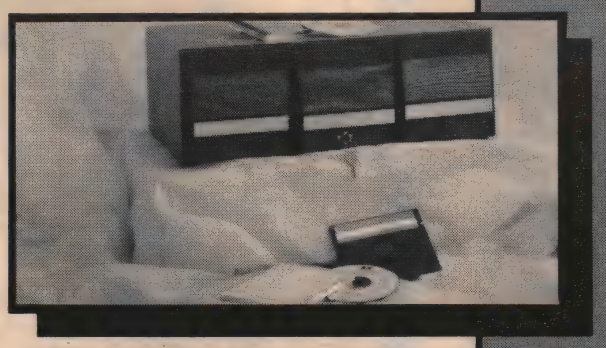

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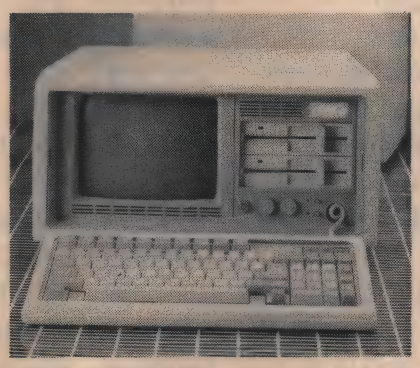

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Networks
continued from page 121

work can defeat its speed advantage by spending too much time checking for errors and transmitting the same data over and over again.

The Net-Board, marketed by PC Office, characterizes many office connectivity networks. Rather than focus on increasing transmission speed, the Net-Board attacks the root of the problem.

Using a unique transmission scheme, the Net-Board checks for errors during transmission while most other network boards check for errors only after sending data. The difference is like giving instructions to someone over the telephone or through the mail. The Net-Board, like a telephone, lets you communicate and acknowledge messages immediately. Most other network boards, like the mail, must wait until it receives the entire message before it can send an acknowledgement, slowing down the speed of the network considerably.

Although the performance of a network depends on its physical capabilities, training and maintenance can determine how effectively people can use the network. Since the more sophisticated network operating systems offer so many different features, learning how to use the network can be confusing. Such a network can force a company to hire someone just for learning and maintaining the network. In a large corporation, this may be acceptable and even desirable. In a small business or office, the cost of a network administrator can be prohibitive.

Office connectivity networks may reduce hardware costs by using special network boards or eliminating them altogether, but they can also offer lower software costs as well. The main reason is that the networking software often comes bundled with the network boards themselves. Also, because manufacturers design office connectivity networks for fewer numbers of computers, the networking software can be easier to learn.

The documentation for a network vividly demonstrates this point. Manuals for the more sophisticated networks often exceed 500 pages. Office connectivity network manuals, on the other hand, rarely exceed 100 pages because the program provides fewer commands.

Grapevine, a networking program marketed by Computer Pathways, Inc., provides networking features such as electronic mail, password protection, and peripheral sharing using only eighteen commands in addition to the standard DOS commands.

Providing fewer network commands simplifies using the network while simultaneously requiring less memory. The more complicated network programs can gobble up to 200K per computer while Grapevine uses less than 128K of memory per computer.

Clerk, a networking program bundled with PC Office's NetBoard, uses even less memory. Clerk requires less than 20K per computer and has only four additional commands for users to learn. In comparison to Grapevine and Clerk, other network programs require users to learn a multitude of different commands or even an entirely different operating system altogether.

More importantly, office connectivity networks do not require special LAN (Local Area Network) versions of software which costs more and may not even be available. The LAN version of dBase III Plus costs over $200 more, and LAN versions of other popular programs such as WordStar are not even available.

Office connectivity networks provide an alternate networking solution that's easier to use and less expensive to buy. Returning to the example of connecting the office scenario given at the beginning of this article, recalculate the cost of installing a network using an office connectivity network instead.

Estimating the cost of network boards available from a variety of third-party vendors at $350 each, eliminate the need for a dedicated server computer and include the networking software with the network board, the total cost for a network equals $1750 or less than one-third the cost for the original computer system.

The bottom line is really performance. For connecting a small number of computers together, an office connectivity network is not an alternative to other networks. It's the only choice. ●

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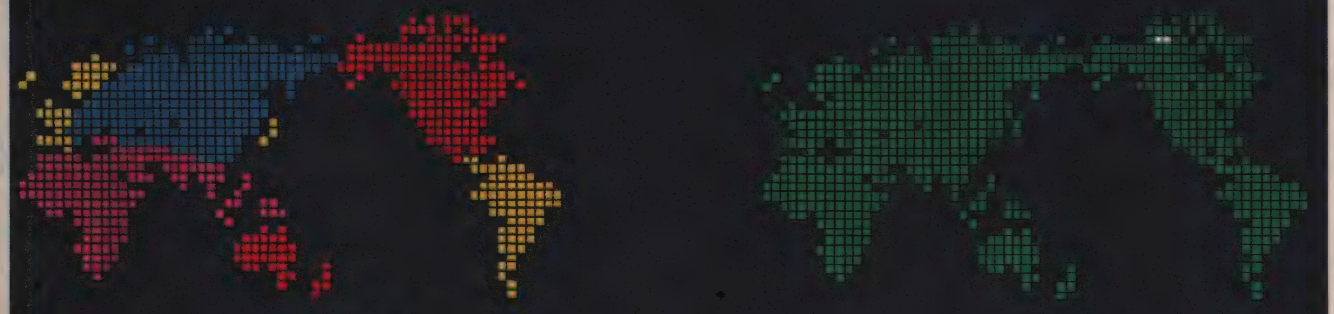

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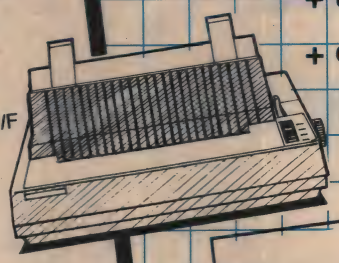

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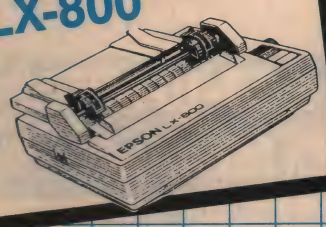

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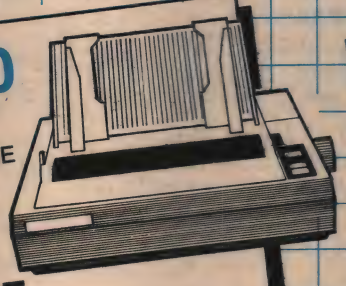

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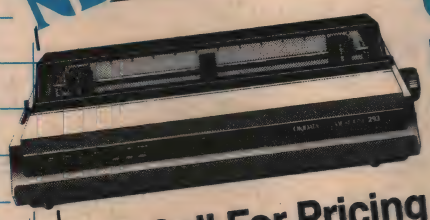

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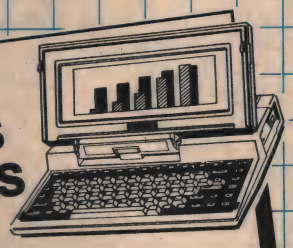

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AP37

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Features	Lotus 1-2-3, Release 2	Mosaic DIAMOND
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Sophisticated string-handling capabilities	◆	◆
"Column hide" makes contents of a column temporarily disappear on screen	◆	◆
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* This is only a partial comparison.

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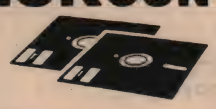

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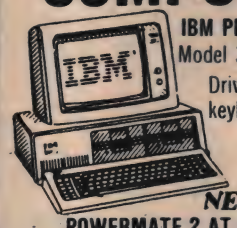

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7405	.17	7474	.30	74163	.50
7406	.23	7475	.35	74164	.70
7407	.23	7483	.45	74165	.70
7408	.22	7485	.55	74166	.90
7410	.17	7486	.30	74173	.75
7413	.33	7490	.37	74174	.70
7420	.17	7493	.30	74175	.80
7425	.25	7496	.30	74192	.70
7427	.25	74107	.20	74193	.80
7428	.25	74109	.45	74195	.80
7430	.15	74116	.99	74199	1.00
7432	.27	74121	.27	74221	.60
7433	.25	74123	.40	74273	1.75
7438	.22	74125	.40	74298	.40
7440	.19	74139	.35	74365	.60
7442	.35	74145	.40	74366	.60
7445	.49	74148	.90	74367	.50
7447	.59	74151	.50	74390	1.40
7448	.59	74153	.35		
7451	.18	74154	1.19		
7453	.22	74157	.30		

74LS

LS00	.14	LS122	.35	LS242	.65
LS01	.14	LS123	.45	LS243	.50
LS02	.14	LS124	1.50	LS244	.55
LS03	.14	LS125	.30	LS245	.55
LS04	.14	LS126	.35	LS251	.45
LS05	.14	LS132	.35	LS253	.40
LS08	.14	LS133	.25	LS257	.35
LS09	.14	LS138	.35	LS258	.45
LS10	.14	LS139	.35	LS259	1.00
LS11	.14	LS145	.75	LS260	.40
LS12	.20	LS151	.35	LS266	.30
LS13	.25	LS153	.35	LS273	.75
LS14	.30	LS154	.85	LS279	.30
LS15	.20	LS155	.50	LS280	.80
LS20	.14	LS156	.42	LS283	.35
LS21	.16	LS157	.30	LS290	.70
LS27	.20	LS158	.25	LS293	.75
LS30	.14	LS160	.25	LS298	.65
LS32	.16	LS161	.35	LS299	1.40
LS33	.25	LS162	.45	LS323	2.25
LS37	.24	LS163	.36	LS348	.75
LS38	.24	LS164	.45	LS364	.90
LS42	.35	LS165	.60	LS366	.40
LS51	.15	LS166	.75	LS367	.35
LS54	.20	LS169	.90	LS368	.30
LS55	.20	LS174	.35	LS373	.55
LS73	.25	LS175	.35	LS374	.60
LS74	.22	LS181	1.25	LS375	.35
LS75	.25	LS191	.45	LS377	.75
LS85	.45	LS192	.65	LS378	.80
LS86	.20	LS193	.65	LS390	.80
LS90	.35	LS194	.40	LS393	.75
LS93	.35	LS195	.52	LS399	1.00
LS107	.28	LS196	.55	LS541	1.20
LS109	.20	LS197	.75	LS645	.75
LS112	.25	LS221	.50	LS670	.80
LS113	.25	LS240	.50	LS724	.40
LS114	.25	LS241	.60	26LS30	.75
25LS2569	1.50			26LS32	.75

74ALS

ALS00	.45	ALS21	.45	ALS74	.45
ALS08	.45	ALS30	.45	ALS113	.45
ALS10	.45	ALS37	.45	ALS161	.60
ALS11	.45				

74F

F00	.45	F109	.70	F244	1.49
F10	.45	F138	.79	F245	1.49
F14	.55	F139	.79	F257	.89
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S03	.25	S112	.40	S195	1.25
S04	.25	S132	.99	S240	.99
S05	.25	S133	.29	S241	.75
S08	.29	S134	.40	S244	.99
S10	.25	S138	.60	S251	.60
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S15	.29	S151	.60	S283	1.25
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S74	.33	S175	.70		

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5101E-1	1.00
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262.144	.75	10.000	1.25
300.000	.75	10.69425	2.50
1.5432 Mhz	.75	10.738635	1.00
1.8432	1.59	10.8864	1.49
1.940	1.10	10.920	1.49
2.000000	1.75	11.088	1.59
2.4576	1.50	11.155	1.00
2.560	1.49	12.000	1.50
3.000	1.15	13.17020	.70
3.120	1.20	13.440	1.00
3.2	1.49	14.31818	1.00
3.4560	1.49	15.000	.75
3.579545	.60	15.2	1.10
3.6864	1.10	16.00000	1.50
4.000	1.75	16.5888	1.49
4.194304	1.50	17.1	1.75
4.433618	.75	18.2259	1.00
4444.000	1.25	18.4320	1.49
4.9152	2.49	18.432OSC	2.95
5.000000	1.50	20.000	1.29
5.0688	1.70	20.375040	.60
5.120	1.25	21.87108	1.00
6.000	1.00	87.3333	1.00
6.144	1.50	91.000	1.00
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7.164112	1.00	143.7640	.75
7.3728	1.49		

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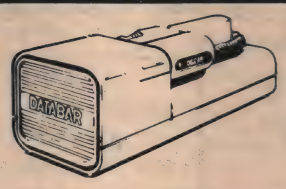

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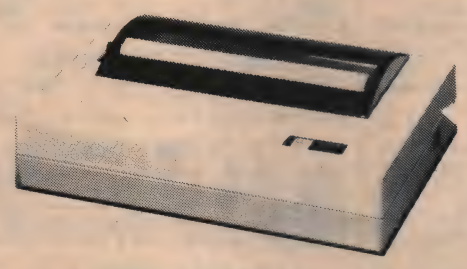

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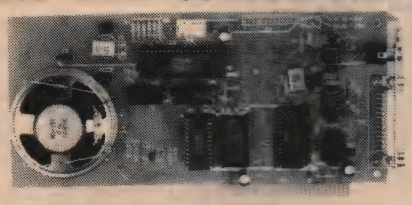

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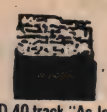

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2160-25	DB-25 FEMALE	2.00

DAC EASY ACCTNG SOFTWARE SALE!!!

DAC ACCOUNTING SOFTWARE - STK# 750-750 ——$12.50
DAC ACCOUNTING TUTOR—— STK# 750-755 ——$8.50
DAC EASY PAYROLL —— STK# 750-751 ——$10.50
DAC PAYROLL TUTOR —— STK# 750-755 ——$8.50
DAC EASY MATE —— STK# 750-752 ——$9.00
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COMPUTER HARDWARE

900-202 BRASS MOTHERBOARD STANDOFFS ——— $.07
900-206 DB-25 LOCKING SCREWS- 4/40 THREAD ——— $.09
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900-212 PLASTIC CARD GUIDES - SNAP-IN TYPE ——— $.15
900-214 REAR CARD SLOT FILLER PLATE ——— $.15
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MACINTOSH PRINTER SOFTWARE- --EPSTART--

ALLOWS YOU TO RUN EPSON PRINTERS OFF A MACINTOSH COMPUTER.
STK# 750-760 —$14.95

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5.25" DISK DRIVE POWER SUPPLY

MFG. BY GENERAL INSTRUMENT— INPUT 115 VAC
OUTPUT: +5VDC @ 5 AMPS
+12VDC @ 2.5 AMPS
−12VDC @ .75 AMPS
STOCK # 150-120 —— $19.95

COMPUTER BOOK

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700-118 ILLUS. TURBO PASCAL
700-128 ILLUS. WORDSTAR
700-107 ILLUS. C PROGRAMMING
700-125 ILLUS. MS DOS 3.2
700-119 ILLUS. SUPERCALC
700-110 ILLUS. DBASE III
700-112 ILLUS. AUTOCAD
700-109 ILLUS. DBASE II
700-181 ILLUS. DOS/BOOS ASSM
700-194 ILLUS. FRAMWORK
700-185 ILLUS. WORD PERFECT
700-183 ILLUS. IBM PC AT
700-184 ILLUS. MICRO SOFT WIND.
700-124 ILLUS. MULTIMATE
700-182 ILLUS. PARADOX
700-170 ILLUS. AT CLONE TECH
700-150 ILLUS. XT CLONE TECH
700-128 ILLUS. DBASES PLUS
BOOKS-$14.75

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STANDARD TRANSFORMERS

ALL INPUTS 115VAC

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4125-520	6.3VAC @ 1AMP.	$1.35	$10.00
4125-530	12.6VAC @ 350MA.	$1.35	$10.00
4125-540	24VAC @ 1AMP.	$2.75	$25.00
4125-542	24VAC @ 3AMP	$4.75	$37.50

FANS 115 VAC

4" — $5.00
3" — $7.50

SUPER REGULATOR CIRCUIT BOARD

3 COMPLETE REGULATOR CIRCUITS ON A SINGLE CARD. HAS 3-LM723 REGULATORS. 2N2955, 2N3055, & 2N4441 POWER TRANSISTORS. HAS TRIMPOTS & INDIVIDUAL CONTROLS.
STK# 700-325 ——— $4.00

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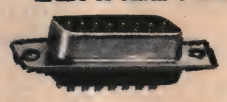
HAS 5 LARGE RECTIFIERS & 3 LARGE FILTER CAPACITORS. EASY TO CONNECT TO.
STK# 700-335 —— $3.50

COMPUTER CONNECTORS



IDH FEMALE SOCKET CONNECTOR

2120-10	10 PIN	$0.55
2120-20	20 PIN	.72
2140-26	26 PIN	.90
2120-34	34 PIN	.95
2140-50	50 PIN	1.25

IDC CARD EDGE CONNECTORS

2150-20	20 PIN	$0.75
2150-34	34 PIN	.95
2150-50	50 PIN	2.25

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2220-90	DB-9 MALE	$0.59
2220-91	DB-9 FEMALE	.59
2220-25	DB-25 MALE	.69
2220-25	DB-25 FEMALE	.69
2220-37	DB-37 MALE	1.75

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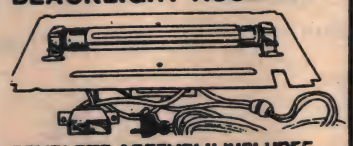
2520-09	HOOD FOR DB-9	$0.45
2520-25	HOOD FOR DB-25	.55

DB TYPE RIBBON CONNECTORS

2160-25	DB-25 MALE	$2.00
2160-26	DB-25 FEMALE	2.00
2160-37	DB-37 MALE	7.00

BLACKLIGHT ASSEMBLY



COMPLETE ASSEMBLY INCLUDES ON/OFF SWITCH, BALLAST, POWER CORD, & FUTABA F4T5-BL LAMP. USE FOR SPECIAL EFFECTS LIGHTING OR EPROM ERASING.
STK #7000-124——$8.95

DAC ACCOUNTING CLOSE-OUT BUY

750750	DAC EASY ACC'TG	$12.50
750751	DAC ACC'T TUTOR	$8.50
750752	DAC PAYROLL	$10.50
750753	PAYROLL TUTOR	$8.50
750754	DAC EASY PORT	$9.00
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REMOVED FROM WORKING EQUIPMENT DRIVING 8" 10 MEG DRIVES.
STK#350-1002 —$35

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C-64 REPLACEMENT POWER TRANSFORMER.
STK#4125—64 — $19.95

CPU/RAM BACK-UP CAPACITOR-
FOR CMOS CPU'S .22MFD @ 5.5 WVDC
STK# 575-22 -$1.35-

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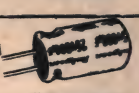
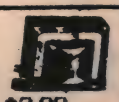
PRIMARY MEMORY EXPANSION CARD. 256K WITH NO MEM. INST.
STK# 7000-300 —— $14.95



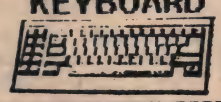
LOW LEAKAGE CAP
1 UFD. @ 50V
STK# 12-1M50V — 20/$1.25



ISOLATION TRANSFORMER
117:117 VAC @ 125VA.
STK# 4125-115 —— $3.00

ULTRA-VIOLET LAMP
8 WATTS / 115VAC. MFG BY FUTABA PART #FTB 8T6BL.
STK#3650-86 —— $1.00

MICRO SWITCH KEYBOARD



MICRO SWITCH MODEL 92SC48-20-1 KEYBOARD. 92 KEYS. MECHANICAL KEYS. EXACT IBM "CLICK" FEEL. STANDARDD ASSCII ENCODING.
STK# 200-920 — $8.00

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SUNTECH POLAR FILTER SCREEN. FITS ALL 12 & 14" MONITORS. CUTS DOWN ON GLARE & STATIC CHARGE.
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VINYL DISKETTE HOLDERS

LOOSELEAF SIZE VINYL DISKETTE HOLDERS. HOLDS 4 DISKETTES PER SHEET. 8 1/2" X 11" SIZE.
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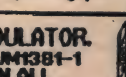
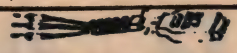
3V LITHIUM BATTERY HOLDER

USED IN CLOCK CIRCUITS.
STK# 2359
10/$3.00



RF MODULATOR.

ASTEC MODEL UM1381-1 CAN BE USED ON ALL VIDEO SOURCES. BUILT-IN A/B SWITCH. OPERATES 12VDC. BRAND NEW.
STK# 300-994 —— $3.50



TI 99/4A CASSETTE INTERFACE CABLE- CABLE HAS A DB-9 CONNECTOR ON ONE END & 3 RCA PHONO JACKS ON THE OTHER END.
STK#1850-83 -$1.50 20/$12

COMMODORE VIC-20 CPU WITH KEYBOARD

COMPLETE COMMODORE VIC-20 CPU WITH MATCHING KEYBOARD. UNITS ARE COMPLETE. USE AS CONSTRUCTION PROJECT OR REPLACEMENT PARTS. REQUIRES POWER SUPPLY.
STK# 3725-820——$14.95

MC68705

HMOS, 8-BIT, MEDIUM PERFORMANCE MICROPROCESSOR/EPROM. ON CHIP RESOURCES: 112 BYTES RAM, 8 INPUTS & 24 PROGRAMMABLE BI-DIRECTIONAL OUTPUTS. SELF PROGRAMMING BOOT STRAPS.
STK# 68705 ——— $9.25

ATARI GAME ROMS FOR 2600

THESE ARE ROMS THAT HAVE BEEN PROGRAMMED WITH GAMES FOR THE ATARI 5200 GAME MACHINE. TO USE THESE SIMPLY OPEN ANY EXISTING ATARI GAME CARTRIGE & REPLACE THE EXISTING ROM WITH ONE OF THESE. APPROX 10 DIFFERENT ONES.
STK#2550-10 —— 10/$2.50
100/$5.00 1000/$40.00

SURPLUS TTL MONITORS

-----SAMSUNG TTL-----

COMPLETE SAMSUNG TTL MONITOR. INCLUDES PIX TUBE & CIRCUIT BD. NO CHASIS OR FRAME. REQUIRES DC POWER SUPPLY. FACTORY NEW. 12" MONITOR - GREEN SCREEN.
STK# 3725-135 —— $14.95

----TI TTL MONITOR---

TTL MONITOR USED BY TEXAS INST. 12" MONITOR IS COMPLETE WITH CHASIS, CASE, PIX TUBE, VIDEO BD., & DC POWER SUPPLY. HAS BRIGHTNESS CONTROL & DB-9 CONNECTOR REMOVED FROM WORKING SYSTEM.
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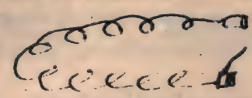
12" HIGH RES BLACK & WHITE SCREEN. MOUNTED IN FRAME BUT NO CASE. PIX TUBE & VIDEO BOARD. REQUIRES +13VDC. HAS EDGE CARD CONNECTOR FOR ALL TTL INPUTS.
STK# 3725-199 —— $19.95

KEYBOARD REPLACEMENT CABLES



-IBM REPLACEMENT KYBD CABLE 6' COILED CORD. CREAM COLOR. HAS STD 5 PIN KEYBOARD DIN JACK ON ONE SIDE & 5 PIN FEMALE INLINE CONNECTOR ON THE OTHER. FOR ALL IBM TYPE AT/XT KEYBOARDS.
STK# 600-5150 —— $4.95

REPLACEMENT KEYBOARD CABLE USED ON MANY XT COMPATIBLE TYPE COMPUTERS. 6' GREY COILED CORD WITH STANDARD 5 PIN DIN JACK ON ONE END & 5 PIN TELEPHONE TYPE JACK ON THE OTHER.
STK# 600-5170 —— $3.59

WALL PLUG TRANSFORMERS

ALL INPUTS 115VAC

STK#	RATING	MFG	COST EACH	COST QTY 10
4125-300	6VDC @ 300MA.	TI	$1.75	$12.00
4125-860	17.7VAC @ 75VA	IBM	$9.00	$80.00
4125-917	12.5VAC @ 265MA.	TI	$2.75	$25.00
4125-103	9VAC @ 600MA.	ATARI	$2.50	$18.50
4125-950	18VAC @ 22VA. & 7.5VAC @ 1VA.	TI	$4.50	$37.50
4125-243	12VAC @ 1.7AMP.	MB	$3.45	$27.50
4125-116	9.5VAC @ 1AMP	COMMODORE	$3.75	$30.00
4125-233	9VDC @ 440MA.	TELE	$2.50	$20.00
4125-500	7.5VDC @ 150MA.	NORELCO	$2.25	$18.00
4125-115	5.8VDC @ 145MA.	NORELCO	$2.00	$15.00

CALL FOR IC'S, CAPS TRANSFORMERS — ANYTHING ELECTRONIC

LOLIR COMPUTER/SURPLUS CENTER
2741 BELTLINE RD. #111
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214-416-5155

* ITEMS RETURNED MUST BE AS-NEW WITHOUT DAMAGE. MANUALS, SOFTWARE, CABLES, &PACAGING MUST BE NCLUDED. RETURNS MUST BE PREPAID &INSURED. A RMA NUMBER MUST BE DISPLAYED ON OUTSIDE BOX.

TERMS: MASTER CARD / VISA, CHECK, MONEY ORDER TX RES. ADD 8%TAX. MINIMUM FREIGHT $4.00. ADD $2.50 COD CHARGE. 2% CHARGE ON MC/VISA. PLEASE INCLUDE PHONE NUMBER.

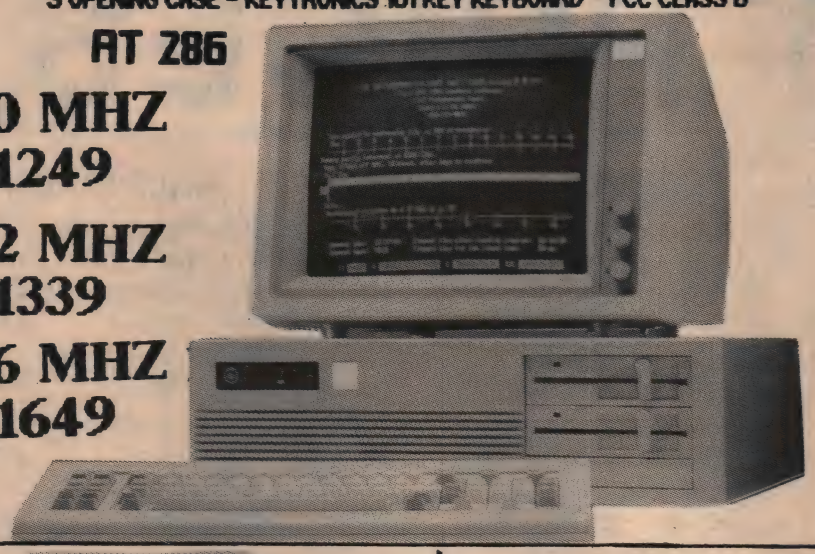
INTEL 80286 PROCESSOR - 80287 CO-PROCESSOR OPIONAL
512K RAM INSTALLED - "0/T" WAIT STATE SELECTABLE
1.2 MEG FLOPPY - WESTERN DIGITAL CONTROLLER - 20 MEG DRIVE
MONOCHROME GRAPHICS CARD & MONOCHROME MONITOR
SERIAL - PARALLEL - CLOCK/CALENDAR - POWER SUPPLY
3 OPENING CASE - KEYTRONICS 101 KEY KEYBOARD - FCC CLASS B

AT 286

10 MHZ $1249

12 MHZ $1339

16 MHZ $1649



80386

80386 - 20 SYSTEM

INTEL 80386 PROCESSOR
OPTIONAL 80387 CO-PROCES.
LANDMARK SPEED TEST= 20MHZ
512 K MEMORY
1.2 MEG DISK DRIVE
HARD/FLOPPY CONTROLLER
FAST 40 MEG DRIVE
MONOCHROME GRAPHICS
HI-RES MONOCHROME MONITOR
2-SERIAL & 2 PARALLEL PORTS
220 WATT POWER SUPPLY
KEYTRONICS K-101 KEYBOARD
FCC CLASS B APPROVAL
COMPLETELY ASSEMBLED

$2249

XT TURBO

8088-2 PROCESSOR 4.77/10 MHZ
256 K RAM - 360K FLOPPY
FLOPPY CONTROLLER -
20 MEG & CONTROLLER
MONO CARD / PARALLEL PORT
HI-RES MONO MONITOR
AT STYLE KYBD - 150 W POWER SUP
FCC CLASS B - 1 YR. WARRANTY
8 MHZ - $795
10 MHZ - $845
12 MHZ - $895

VIDEO CARDS

300404	COLOR CARD W/P.PORT	$45
300409	MONOGRAPHIC W/PP	$48
300550	EGA, 640X480	$129
300555	STD. EGA 640X350	$103
300560	SUPER EGA 960X720	$169

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400250	SERIAL PORT CARD W/OPTION FOR 2ND SERIAL PORT	$21
400255	PARALLEL PRINTER CAR	$17
400320	AT/XT SERIAL(2ND OPT)/ PARALLEL PORTS.	$45
400305	XT MINI I/O. SERIAL(2ND OPT.) PARALLELL/GAME/CLK-CAL	$58
400310	AT MINI I/O. SERIAL(2ND OPT) PARALLEL, & GAME PORTS	$58
400384	XT 384 MEM EXP. W/SERIAL PARALLEL, GAME, CLK-CAL	$72
400222	PS/2 MULTIFUNCTION CARD - 3 MEG EXPANSION - PARLLEL - SERIAL (2ND SERIAL OPTIONO WITH 512K INSTALLED	$295

MODEMS

4001088	1200/300 ZUCKER INT.	$67
4001090	2400/1200 INTERNAL	$139

MEMORY EXPANSION

400576	576K MEM EXP. FOR XT	$28
400705	2 MEG EMS FOR XT/AT	$68
400375	SUNTEK 2MEG AT MEM EXP. EMS OR EXPANDED MEMORY	$98
400390	128K BACKFILL BOARD FOR AT & 386 SYSTEMS.	$72
400386	32 BIT 2MEG EXPANSION BD. FOR 386 MOTHERBOARD WITH 0 MEG INSTALLED.	$195
400387	32 BIT 8 MEG EXPANSION FOR 386 BDS. W/NO MEMORY	$225
400395	32 BIT 2 MEG EXPANSION BD. FOR VNC 386 BOARD (0 MEM)	$245

FLOPPY & HARD DRIVE CONTROLLERS

350101	XT FLOPPY CONTROLLER	$21
350105	XT FLOPPY CONTR. W/SERIAL, PARALLEL,GAME, CLK-CAL	$55
350500	DRIVEMASTER 1.2/360K CONTR. FOR AT OR XT SYSTEMS	$48
350106	1.2/360 CONTROLLER W/SERIAL PARALLEL,GAME,CLK-CAL. FOR XT	$85
350120	WESTERN DIGITAL XT CONTR. WITH AUTOCONFIG ROM.	$54
3501003	WESTERN DIGITAL AT DUAL HARD/FLOPPY CONTROLLER	$125
3502072	ADAPTEC 2072 XT-RLL XT CONTROLLER	$65

DISK DRIVES

450125	MITSUMI 360K DRIVE - QUIET - JAPANESE DIRECT DRIVE	$72
450136	MITSUMII 1.2MEG DRIVE WHITE FACEPLATE	$88
450350	MITSUMI 3.5" 720K DRIVE	$85
450360	MITSUBISHI 3.5" 1.4 MEG DR.	$119

HARD DISK DRIVES

500225	SEAGATE ST225 20 MEG	$235
500238	SEAGATE ST-238 RLL DR.	$245
5003650	MINISCRIBE 40 MEG	$355
500251	SEAGATE ST251 40 MEG	$375
5002511	SEAGATE 251-1 40 MEG HIGH SPEED DRIVE	$465
5001335	MICROPOLIS 85 MEG	$775
5004096	SEAGATE 85 MEG	$775

MONITORS

5501254	PACKARD BELLI TTL AMBER. TILT/SWIVEL BASE	$72
5501252	SAMSUNG TTL AMBER. TILT/SWIVEL	$78
5501253	SAMSUNG TTL GREEN. TILT/SWIVEL	$77
5501464	SAMSUNG RGB MONITOR. 640X200. TILT/SWIVEL	$245
5508562	MAGNAVOX RGB MONITOR 640X200 RESOLUTION	$245
5509053	MAGNAVOX EGA MONITOR. 640X350	$375
5501371	MITSUBISHI MULTISYNC EGA MONITOR	$525
550401	NEC MULTI SYNC II	$675
5505155	LOGITECH MULTISYNC EGA MONITOR	$545

LOGITECH / MICE

410700	C7 SERIAL W/PLUS SFTWR	$72
410705	C7 SERIAL W/LOGIPAINT	$95
410707	C7 BUS MOUSE	$72
410710	C7 SERIAL W/LOGICADD	$95
410715	C7 SERIAL PUBLISHER	$125
410720	C7 BUS PUBLISHER	$125

XT SPEEDEUP BOARDS

400286	SUNTEK ROCKET 286. WITH 286 PROCSOR. 256K CACHEMEM	$195
400888	8 MZ. SPEED-UP BOARD FOR STD XT MOTHERBOARD.	$35

COMPUTER CASES

10020	EXTERNAL HARD DRIVE CASE WITH 65 WATT PWR SUP.	$125.
10060	XT SLIDE CASE W/SPKR	$27.
10075	AT JR. STYLE CASE	$39.
10090	AT CASE W/FRONT PANEL RESET & 3 LED'S	$68.
100-95	AT TOWER CASE WITH DIGITAL READOUT	$285

POWER SUPPLIES

150150	XT 150 WATT POWER SUP	$44
150180	AT JR SUPPLY - 180 WAT	$68
150200	AT TOWER CASE POWER SUP.	$75
150220	AT POWER SUPPLY 220W	$72.

KEYBOARDS

200101	KEYTRONICS ENHANCED K101 AT/XT KEYBOARD.	$59
200105	MITSUMI ENHANCED 101 KEY AT/XT KEYBOARD.	$55
200309	STD AT STYLE KEYBOARD FOR AT/XT - 3-LED'S	$42

MOTHERBOARDS

XT - MOTHERBOARDS

250153	8MHZ TURBO XT MBD. LOW NOISE. SPKR. TURBO. KEYLOCK. & RESET CONNECTIONS. WITH BIOS.	$79
250157	10 MHZ.TURBO MBD. SAME SPECS AS ABOVE.	$85
250259	10MHZ MULTI-TURBO MBD. HAS FLOPPY CONTROLLER. I/O PORTS. CLK/CAL BUILT ON MBD.	$139
250159	12 MHZ TURBO XT MOTHERBOARD. NORTONS SI=6.6!!!!!!!	$119

AT - MOTHERBOARDS

250287	DTK AT 6/10 MHZ. MBD. 1 MEG RAM MAX (W/OK INST.) "0" WAIT OPT. 8 SLOTS. VERY STABLE	$275
250288	DTK AT 6/12 MHZ MBD. SAME SPECS AS ABOVE. VARIABLE WAIT STATES CAN BE INSERTED ON THE I/O BUS.	$325
250350	12MHZ MINI AT MBD. FITS IN MINI-AT CASES OR XT CASES.	$335
250405	ACM 6/10MHZ. MBD. 1 MEG RAM (W/ OK INST) "0" WAIT OPT. WITH PHOENIX BIOS.	$255
250475	NOVA 16MHZ AT WITH 1MEG RAM NORTON SI = 18.7	$890

"386" MOTHERBOARDS

250400	WEDGE 80386 MBD. 16 MHZ. SPEED 512K MEM INSTALLED. 2-32 BIT. 4-16 BIT. & 2-8 BIT SLOTS. 387 CO-PROCESSOR SOCKET.	$1275
250401	WEDGE 386/20 MHZ. SAME AS ABOVE W/FASTER SPEED	$1325
250410	FORTRON 386 MBD. 16MHZ. SPEED. 2 SERIAL-1-PARALLEL & CLK/CAL. 2 MEG MEMORY INSTALLED. 2-32 BIT. 4-16 BIT. & 2-8 BIT SLOTS. 384 CACHE MEMORY.	$1925
250415	FORTRON 386-20MHZ. MBD CHIPS TECHNOLOGY SET. 0 MEG MEMORY. 2-32 BIT. 4-16 BIT. & 2-8 BIT SLOTS. AWARDS BIOS	$1375
250500	DTK 386 MBD. 1 MEG RAM MAX ON BOARD (0 MEM INSTALLED) 16 MHZ SPEED. 2-32 BIT. 4-16BIT. & 2-8 BIT SLOTS. HAS 2-SERIAL & 1 PARALLEL PORT	$1075

RAM CHIP PRICES—???

EPROM PROGRAMMERS

EXTERNAL EPROM PROGRAMMER RUNS OFF PARALLEL PORT. ONE AT A TIME. DOES 2716 THRU 27512 EPROMS & MCM68764 $119
INTERNAL 4-POSITION EPROM PROG. 2716-27512 $149

IBM COMPATIBLE BIOS ROMS

TESAS TURBO ROMS - A TWO CHIPBIOS THAT ELIMINATES MANY OF THE TIMING AND "HANG-UP" PROBLEMS THAT OCCUR ON TURBO MOTHERBOARDS.
STK# 1300-15 —— $24.95

RAM TEST DIAGNOSTIC BIOS - GIVES A COMPLETE TEST OF ALL RAM IN THE SYSTOM & GIVES READOUT OF DEFECTIVE PARTS.
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TURBO NORTON ROM - INCREASES NORTON SI BY MINIMUM OF .4 - ALSO GREATLY INCREASES DISK I/O SPEED
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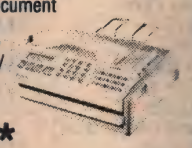

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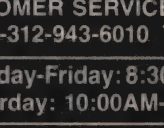

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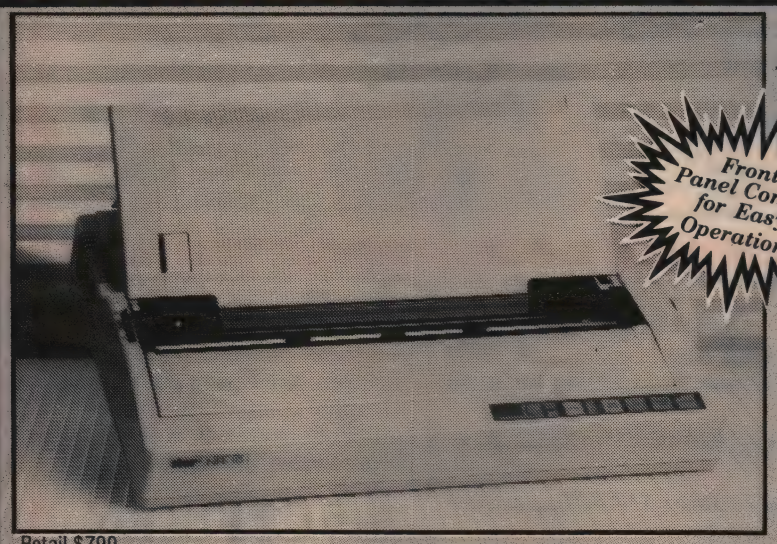

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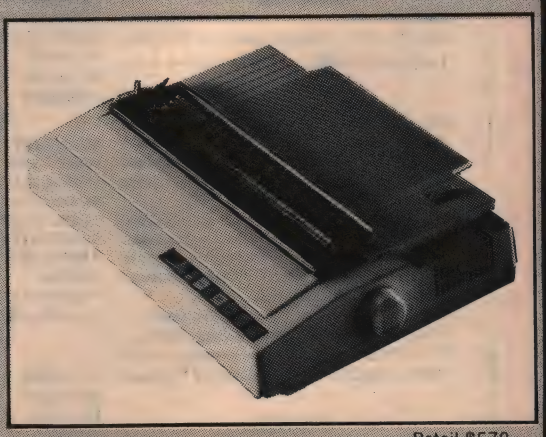

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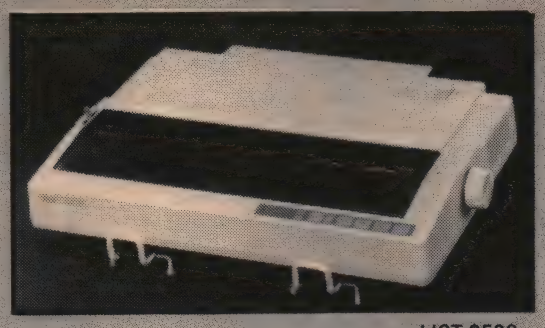

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- 445AT 40MB External w/Control Card $569.00

Video Boards

- Mono Board w/Parallel Port $59.00
- Color Board w/Parallel Port $69.00
- Sigma Design Hi-Res Board $189.00
- Western Digital EGA Board $149.00
- Western Digital Hi-Res EGA Board $179.00
- Video 7 Simply EGA Board $109.00

Rodime

- RO5090
- 85MB AT

$699.00

Includes rails, software, low level formatted, standard kits.

Hard Drives

Priam

- ID45H 44MB Hi-Speed $619.00
- ID62ATD2 62MB Hi-Speed $789.00
- ID230RC 230MB Hi-Speed $2,639.00

Includes rails, software, low level formatted, standard kits.

AT Kit

- 130 MB • AT compatible $2,549.00
- Access time 20MS
- Includes rails, software, low level formatted

Western Digital

- 20MB Kit $249.00
- 40MB Kit $349.00

Includes control card, cables and manual.

Micro Science

- 20MB Kit $279.00
- 31MB Kit $319.00

Includes control card, cables and manual.

Tech Support

Our skilled technical advisors are available to answer questions concerning your new equipment.
1-800-356-5707 (8AM–5PM, Monday-Friday)
In Texas, 1-713-988-3450

This ad supersedes all previous ads.

Floppy Drives

- Fujitsu 360K XT 5.25 $75.00
- Fujitsu 1.2M XT 5.25 $87.50
- Fujitsu 720K 3.5 w/Kit $95.00
- Panasonic JU475 1.2MB 5.25 $99.00
- Toshiba ND04 360K 5.25″ $83.00
- Toshiba ND08 1.2 5.25″ $104.00
- Toshiba ND352 720K 3.5 with 5.25″ Frame $101.00

Intel Memory Expansion Boards

Aboveboard AT (PCM2010) Expansion Board for IBM PC AT $399.00

Aboveboard PS/AT (PCM2110) Multifunction Board for IBM PC AT $449.00

Math Co-Processors

- 8087 (for 8088 5MHz or less) $109.00
- 8087-2 (for 8088 or 8086 8MHz or less) $169.00
- 80287-8 (for 80286 10MHz or less) $239.00
- 80287-10 (for 80286 10MHz or faster) $299.00
- 80387-16 (for 80386 CPU & Inboard 386) $489.00

Western Digital "Factory Authorized Reseller."

WD1003RAH— 16 BIT Single Function RLL $149.00
WD1003RA2— 16 BIT Dual Function RLL $169.00
WD1002A27X—8 BIT RLL $89.00
WD1003WAH— 16 BIT Single Function $109.00

DISCOUNT DATA SYSTEMS P.O. BOX 840449 HOUSTON, TEXAS 77284

DISCOUNT DATA SYSTEMS

YOUR LOW-PRICE SPECIALISTS

Discount Data Systems can also supply all your high-tech office products.

Facsimile Machines

Toshiba 30100
$1,119.00

· Automatic receive · Last number redial; on-hook dialing · Installs in seconds · Speed dial memory for 50 fax and 50 telephone numbers

Toshiba 3300
$1,249.00

· Transmits in as little as 15 seconds · Automatic receive · Last number redial; on-hook dialing · Installs in seconds · Automatic feed · Delay-send feature · Speed dial memory

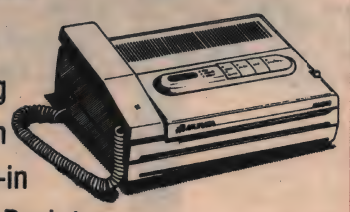
Sharp UX-80 Copier Fax
$999.00

· 40-second transmission · Flatbed scanning · Original transmission from books & magazines · Eight-level half-tone transmission · Reduction & enlargement copier capability · High print quality

Sharp UX-140
$1,019.00

· G3 · Built-in Fax phone · Compact desk-top

Murada M1200
$739.00



· G 1 & 2 · Polling Features · Built-in Fax Phone · Built-in Copier · Portable Desk-top

Discount Data Systems "Super XT"
$649.00

· 4.7–10 MHz · 360K Floppy · MS DOS 3.2 · AT Style Case · 640K Motherboard · Keyboard · Monitor Not Included

Discount Data Systems "Super XT" Upgrades

· W/20MB Hard Drive Kit	$899.00
· W/30MB Hard Drive Kit	$949.00
· W/40MB Hard Drive Kit	$1,049.00

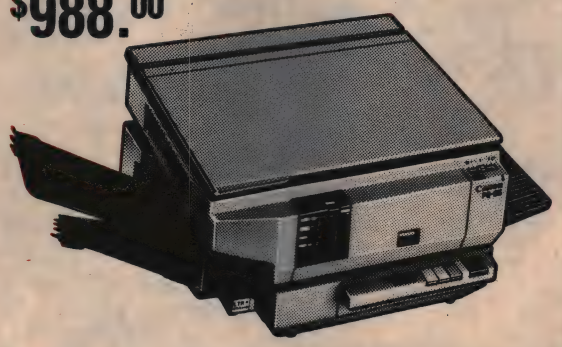
Discount Data Systems 286-10
$999.00

· 8 slots · 6-8-10 MHz · 1 Wait State · Hard Drive/ Floppy Control Board · 1.2 MB Floppy · 640 K · Expandable to 12 MB · Keyboard · 200W Power Supply · MGP · Monitor Not Included

Discount Data Systems 286-10 Upgrades

· W/20MB Hard Drive Kit	$1,279.00
· W/40MB Hard Drive Kit	$1,499.00
· w/75MB Hard Drive Kit	$1,769.00

Canon PC-25 Copier
$988.00



· Enlargement & Reduction Capabilities · 8 cpm · Auto letter size paper tray · Uses PC Cartridge (cartridge sold separately)

This ad supersedes all previous ads.

Tech Support

Our skilled technical advisors are available to answer questions concerning your new equipment.
1-800-356-5707 (8AM–5PM, Monday-Friday)
In Texas, 1-713-988-3450

Ordering Policies:

1. We accept Master Card, VISA, American Express and Discover cards at no charge, as well as money orders, personal checks (allow 10 days for processing), Cashiers checks and wire transfers.
2. If preapproved, we will ship COD with a minimum order of $50.
3. FREE—one year of free technical phone support with each purchase.
4. All products come with a 30-day, money-back guarantee.
5. Company and institutional terms are available upon credit approval.

Return policies:

1. Call for RMA#.
2. All returns must be shipped prepaid and insured.
3. Items must be returned in original condition, with complete packing material and all documentation.
4. There will be a 15% restocking fee for items returned after 30 days.

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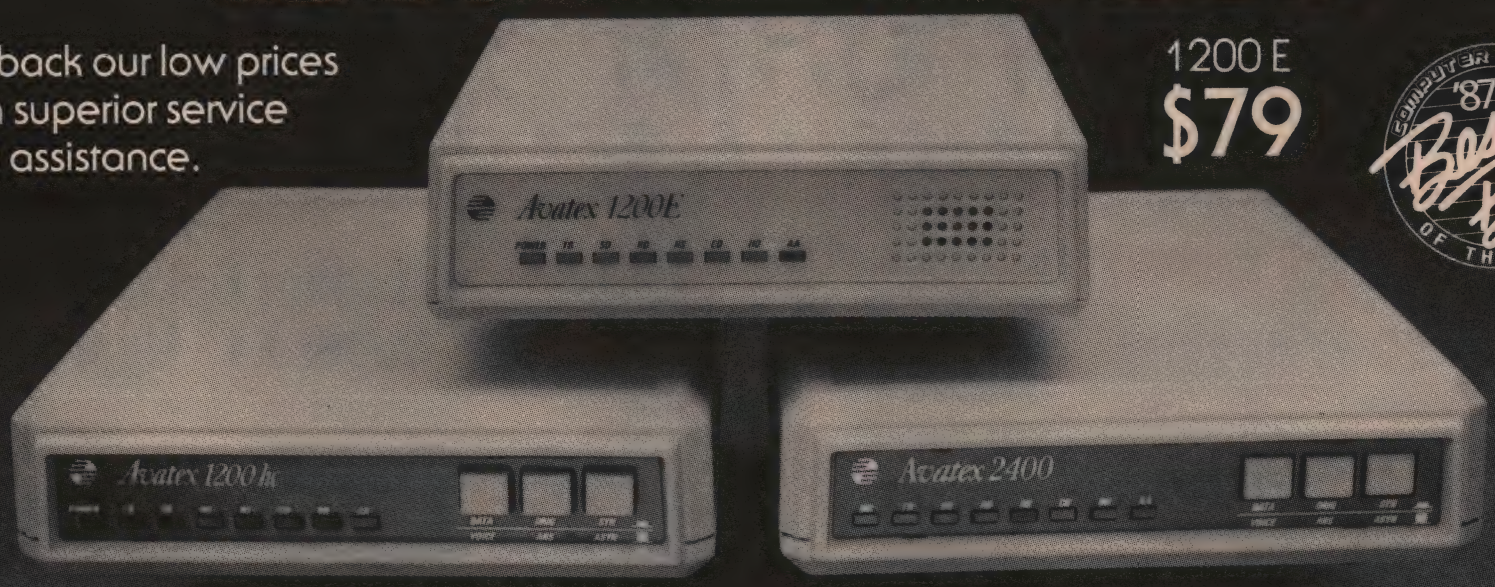
TALK IS CHEAP WITH OUR MODEMS.

We back our low prices with superior service and assistance.

1200 E
$79

'87 COMPUTER SHOPPER Best Buy OF THE YEAR



1200 HC
$99

2400
$169

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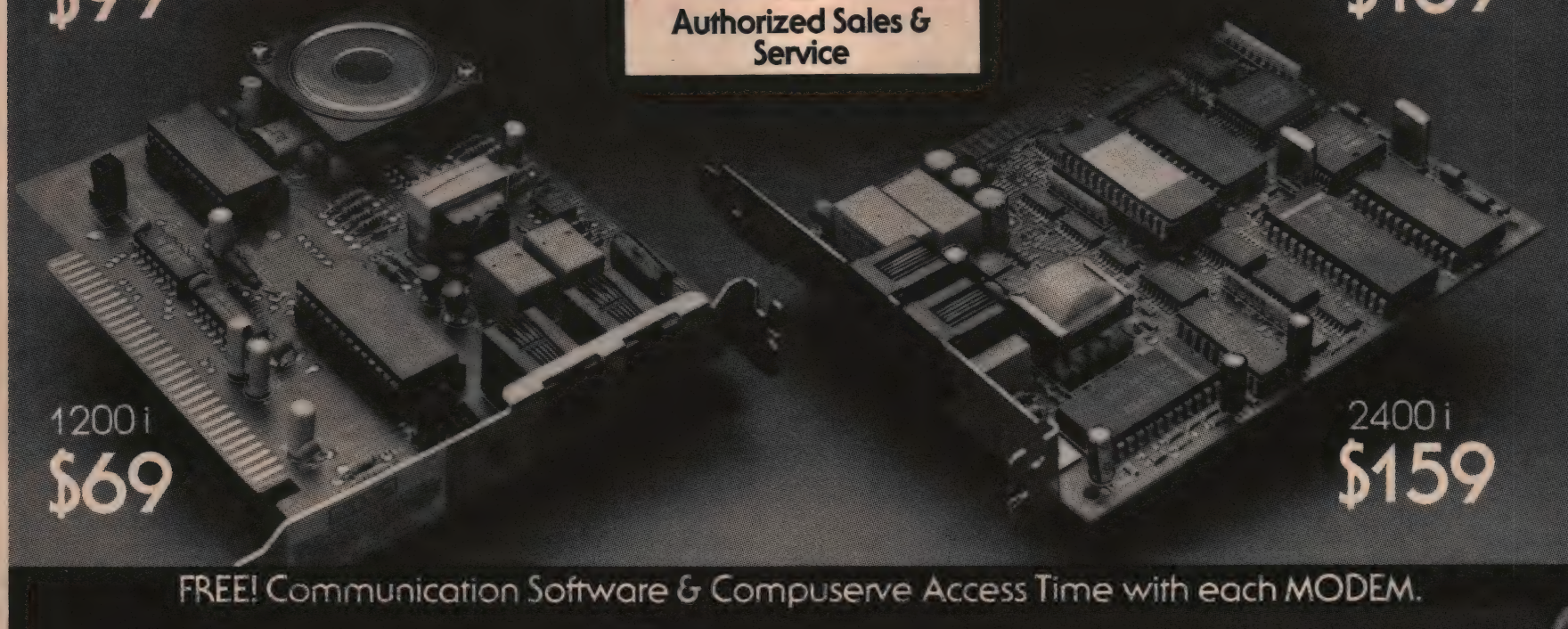
Authorized Sales & Service



1200 i
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2400 i
$159

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CALL FOR INFORMATION ON OUR LOWEST PRICE GUARANTEE

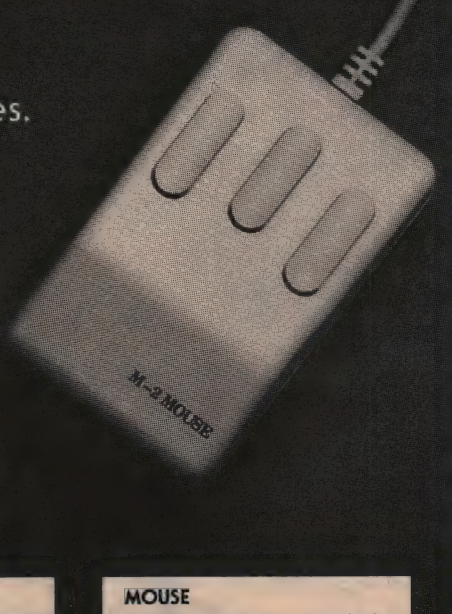
This Mouse really moves.

You'll love the smoothness and comfort of this precision control device.

The Software Package that comes with each Mouse is the #1 Graphics Program currently on the market

Catch a Mouse & DR. HALO II

$69



DR. HALO II SOFTWARE

Merge Text and Graphics Programs to create Charts, Graphs and Illustrations for professional reports.

FEATURES:

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- Scale
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- Graphics Libraries
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21 Typefaces plus Underline, Dropshadow, + more.

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- No Power Supply needed
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- 200 Dot/Inch resolution
- Serial Port Interface
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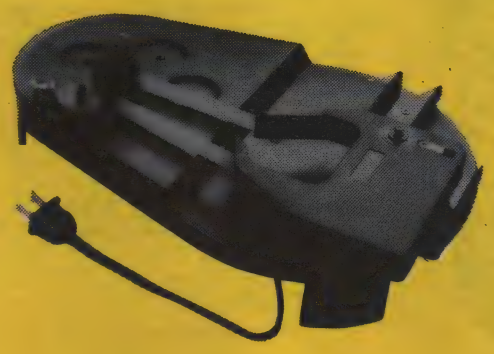
Re-ink any fabric ribbon, automatically for less than 5 cents with our famous Mac Inker



Over 100,000 sold since 1982. Over 11,000 cartridges and spools supported.

Universal (cartridge or spool) Mac Inker **68.50**
Imagewriter I or II Mac Inker mod 234-IM ...**42.00**
Epson Mac Inker mod 271-EP **42.00**
Multicolor Adaptor* **40.00**
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* Re-inks 4 color band ribbons. Fits both the Universal Mac Inker or the dedicated units.

Dedicated Mac Inkers available for special cartridges.

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2 oz. bottle $3.00. Pint $18.50. Other colors available; blue, brown, yellow, green, orange, purple, red silver, gold, OCR, UV resistant and indelible inks and cartridges available for any specialized inking application.

Cartridges - real, good quality ribbon - not cheap stuff. Over 100 types carried. Call for free brochure and listing.

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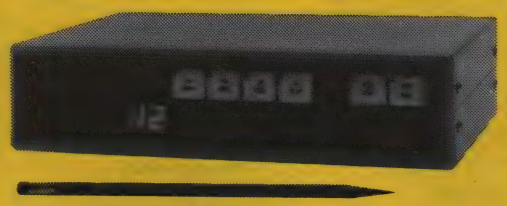
Complete kit allows you to cut, splice and bond your own ribbons.
Mac Bond (specify ribbon width) **50.00**
Extra channel (for each additional width) **10.00**
Unspliced 100 yard pancakes
(black or uninked) **10.00**
Colored pancakes available. Please inquire.

Buffers, Printer Sharers, and Converters



UG-403, 4 computers to 2 printers. Printer selection by AUTOSCAN or front panel selected. Pause and Multiple Copy capability. LED display.
Parallel **399.00**

UG-411, 1 computer, 1 printer, pause/erase, multiple copy with LED display of copies left to print,
Parallel, 64K **129.00**
Parallel, 256K **270.00**

UG-402, 2 computers to 2 printers. 6 data transmission paths, front panel switch selected. Pause and Multiple Copy capability. LED display.
Parallel, 256K **330.00**

UG-408, 4 computers to 4 printers. Port selection by software or front panel switch. Multiple copy capability. LED copy display.
Parallel, 512K **590.00**

UG-409, 6 computers to 4 printers. All features same as UG-408, except no multiple copy capability.
Parallel, 512K **600.00**

HC 775, Serial to Parallel Converter **99.00**
HC 577, Parallel to Serial Converter **99.00**

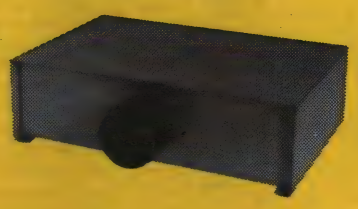
Special Offer

Some of the items listed are on sale. Say "I saw it in the Computer Shopper" and get the sale prices. Order for $100.00 or more and get a free key chain, key beeper and flashlight combined - a $15.00 value.

Mac Master parallel buffer with front panel keyboard to control all printer functions from the buffer keyboard. Available in serial and in parallel.
256K **350.00**
1MEG **550.00**

Proteus parallel switching buffer (via front panel switch or via software control). Multiple copy capability. Only switching buffer that allows both printers to print independently, while freeing the computer for other tasks. ***Computer Shopper's Best Buffer award for 1986.***
64K **169.00**
256K **330.00**

Data Switches



MS2 2 port (Specify 36 or 25 pin) **36.95**

MS4 4 port (Specify 36 or 25 pin) **46.95**

MSX (Cross switch - 2 in/2 out - specify serial or parallel) **46.95**

UG-307 (3 in/2 out) **79.00**

UG-401 Electronic, parallel Smart Switch. 2 Computers to 2 printers. 4 data transmission paths, front panel switch selected with functional display **139.00**

MS4-MAC, 4 port, 9 pin female connectors (for old Macintoshes) **50.00**

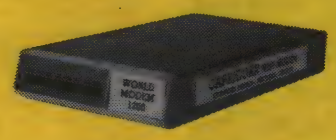
MS4-MAC8, 4 port switch, 8 pin mini DIN connectors for MAC+, SE and MAC II **50.00**

Cables

Just call us and mention what configuration you have. Most of our high quality, shielded cables are $15.00 each. We make customized cables. Call our service line for technical details.

Our Mercury and Capricorn Modems

All our modems are 100% (guaranteed) Hayes compatible and have a 2 year warranty. Full, front panel control lights, auto answer, auto dial, auto repeat, call progress monitoring and speaker volume control.



Mercury 1200 AT, 300/1200 baud **139.00**
Mercury 2400, 300/1200 baud **249.00**
***New,* Capricorn Mini World Modem,** 300/1200 baud. Pocket size modem with BELL 103,212A & CCIT V.21 & V.22 standards **169.00**
Shipping **5.00**

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Argus, the Telephone Scanner. Records and stores length of incoming calls, telephone number and length of call of outgoing calls. Connects to serial or parallel printer to give you a complete record of all your telephone traffic. Excellent to manage telephone time, reduce telephone abuse and for customer bill back. Monitors up to 10 trunks simultaneously. Easy installation. **1499.00**

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BUS 88

640K 8 MHz
10 MHz Optional

Best Buy

$650

SPECIFICATIONS

1. 100% IBM XT-Compatible
2. Phoenix or Award BIOS Installed
3. One Samsung 12SS 12″ High Res. Amber Monitor (720x348)
4. Hercules Graphics Emulation Card
5. Intel 16-Bit 8088-2 Running at 4.77/8.0 MHz
6. 640K RAM on Board
7. Two DS/DD 360K Half-Height Direct Drives
8. 8 Fully IBM-Compatible Expansion Slots
9. Runs all MS-DOS Programs Including 1-2-3, Flight Simulator, Dbase III Plus, Autocad, WordStar, WordPerfect, Etc.
10. Operates MS-DOS, PC-DOS, GW.Basic , Novell, Xenix, and Unix
11. Keyboard Selectable 4.77 and 8.0 MHz
12. Accepts All IBM Parts
13. 150 Watts 110/220 VAC Power Supply w/Four Cables
14. Keyboard w/LEDs, Enlarged Return/Shift Keys and 84 Keys
15. One Printer Port/One Serial Port
16. Multi I/O Card: Controls Floppy Drives w/Printer Port/Game Port/Serial Port and an Optional 2nd Serial Port Battery Backed-Up Real-Time Calendar
17. 8087 Math Co-Processor Socket Installed on Board
18. Six Eprom Sockets Also Installed on Board
19. Power-On Self Testing of Systems Components
20. Speaker Installed for Audio or Music Use
21. Nickel Plated, Enamel Coating, Heavy-Duty Metal Case w/Four Drive Slots
22. Six Slots Still Available After Systems Configurations
23. Ready for 10-20-30-40-65MB Hard Disk Installations
24. Ready for 20-40-60MB Tape Backup Installations
25. Ready for Network/Multiuser Installations
26. Ready for Mouse/Joystick Interface
27. Operating Manuals for Monitor, Keyboard, Motherboard.
28. MGC Card, Multi I/O Card and the Operator
29. 30-Day Money Back Guaranty
30. One Year Fully Warranted Labor and Parts
31. 72 Hours Burn-In Period
32. Fully Set-Up and Diagnostically Tested in America
33. Ready for Immediate Delivery
34. Ship via UPS, Federal Express, APOs and FPOs
35. Worldwide Deliveries too

OPTIONAL FEATURES

1. 10 MHz Systems w/Intel 8088-1 Microprocessor
2. NEC-V20 Microprocessor
3. VGA Systems w/Auto-Switch VGA Card (800x600)
4. EGA Systems w/Auto-Switch EGA Card (640x350)
5. Color Systems w/Color Card (640x200)
6. Hercules Graphics Plus Card and In-Color Card
7. Intel All Above Boards
8. Quadram Quad EGA Plus
9. ATI VGA Card and EGA Wonder Card
10. Everex Memory Expansion Board of 2 MB RAM
11. Everex EVGA VGA Card
12. Genoa Super EGA
13. Video-7 Vega Deluxe EGA
14. Paradise Autoswitch 480 EGA
15. AST Rampage, Advantage Premium, Sixpac Premium
16. NEC 13″ Multisync II (800x560)
17. NEC 15″ Multisync Plus (960x720)
18. NEC 19″ Multisync XL (1024x768)
19. Magnavox Multiscan (926x580)
20. Samsung 14″ 1453M1 EGA (640x350)
21. Magnavox CM8562 13″ RGB Color Monitor
22. Samsung CD1464W 14″ RGB Color Monitor
23. Green or Black/White Monitor
24. 14″ Swivel-Based High Res. Amber Monitor
25. 14″ Dual Frequency Amber Monitor
26. TEAC 5¼″ 360K and 3½″ 720K or 1.44MB Floppy
27. Tallgrass 20/40/60MB Tape Backup Systems
28. Hayes or Smart 1200 or 2400 BAUD Internal or External Modem
29. Epson, Toshiba, Citizen, NEC, and Star Printers
30. Microsoft or Genius Mouse and Joystick
31. Three Serial Ports Card w/Two Parallel Ports
32. Intel 8087-2 or 8087-3 Math Co-Processor
33. Minicenter as shown
34. Minicase as shown in Minibus 286
35. 2nd Serial Port Upgrade
36. 3M 5¼″ DS/DD or DS/HD or Sony 3½″ DS/DD Diskettes
37. Software of All Kinds Including Microsoft MS-DOS 3.3
38. Portable Systems with 9″ EGA or Amber CRT Monitor
39. Portable LCD Systems with 600x400 or Gas Plasma Display
40. Laptop Systems with 20-30-40MB 3½″ Internal Hard Disk
41. Multiuser or Networking Installations

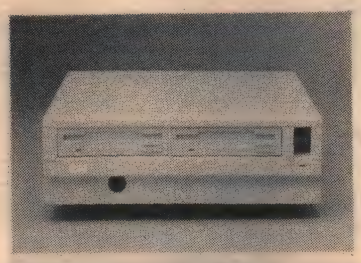
BUS88 w/10 MB & One Floppy
Miniscribe 3012, 95MS $850
BUS88 w/20 MB & One Floppy
Seagate ST-225, 65MS $900
BUS88 w/30 MB & One Floppy
Seagate ST-238, 65MS $950
BUS88 w/40 MB & One Floppy
Miniscribe 3650, 60MS . . . $1,000

SUPERMINI BUS 88

640K 10 MHz

$750

1. The Smallest XT in the World
2. 100% IBM XT-Compatible
3. 100% Compatible ERSO BIOS Installed
4. Hercules Graphics Emulation Card w/Printer Port
5. 10 MHz Systems w/Intel 8088-1 Microprocessor
6. 640K RAM on Board
7. CPU Dimensions: 10¼″(D) × 10¼″(W) × 3″(H)
8. CUP Weights Less Than 9 lbs., Easy to Carry Around
9. One 12″ High Res. (720x348) Amber Monitor
10. Enhanced Keyboard w/LEDs, 101 Keys and Enlarged Return/Shift Keys
11. Runs All MOS-DOS Programs Including 1-2-3, FLight Simulator, Dbase III Plus, Autocad, WordStar, WordPerfect, Etc.
12. Operates MS-DOS, PC-DOS, GW Basic, Novell, Xenix, Unix
13. Keyboard Selectable 4.77 and 10 MHz
14. One Expansion Slot Available
15. One Parallel Printer Port Built-In
16. Two Serial Ports Built-In
17. Battery Backed-Up Real-Time Clock/Calendar
18. Two Floppy Disk Controller Built-In
19. Mono/Color Dual Display Interface Built-In
20. 40 Watts 115/230V Switchable
21. Two 3½″ 720K Floppy Disk Installed
22. Speaker Installed for Audio or Music Use
23. 8087 Math Co-Processor Socket Installed
24. Ready for Workstation/Networking Installations
25. Operator's Manual Included
26. 30-Day Money Back Guaranty
27. One Year Fully Warranted Parts and Labor
28. 72 Hours Burn-In Period
29. Ready for Immediate Delivery
30. Ship via UPS, Federal Express, APOs and FPOs
31. Worldwide Deliveries too



Network/Multi-User Installations

Price subject to change without notice

GRAPHICS BOARDS

GB100	Mono/Graphics/Printer Port	$45
GB101	Color/Graphics/Printer Port	45
GB104	Color/Mono Dual Display	80

ADD-ON BOARDS

AB102	Multi I/O Card w/Cable	50
AB104	RS232 w/Two Port	25
AB105	Clock Card	20
AB106	Parallel Printer Port	15
AB300	Everex Magic I/O for AT Parallel/Serial	65
AB334	Everex 170B w/3 Serial & 2 Parallel	75
AB201	Game Card	20

KEYBOARDS

KB100	XT/AT 84 Keys	50
KB701	XT/AT 101 Keys w/12 Function Keys	60
KB703	Key Tronics 101 Keys w/12 Function Keys	95

MOTHERBOARDS

MB100	XT 4.77/8.0 MHz	90
MB102	XT 4.77/10 MHz	100
MB200	AT 6/10 MHz	325
MB202	AT 6/12 MHz	375

HARD DISKS

HD100K	20MB, Seagate ST-225 w/Controller/Cable	260
HD101K	30MB, Seagate ST-238 w/Controller/Cable	300
HD103K	40MB, Miniscribe 3650 w/Controller/Cable	350
HD201	40MB, Seagate ST-251	550
HD205A	65MB, Seagate ST-277	575
HD206	72MB, Miniscribe 6085	790
HD208	84MB, Seagate ST-4096	850
HD209	103MB, Priam ID-100	1,300

FLOPPY DISKS

FD100	360K, 5¼″ Fujitsu Black M2551A	70
FD102	360K, 5¼″ TEAC Black FD55BV	80
FD300	720K, 3½″ TEAC Black FD35	90
FD201	1.2MB, 5¼″ TEAC Beige FD55 GFR-570-U	95
FD302	1.44MB, 3½″ Toshiba 4603-A0K	125

POWER SUPPLIES

PS100	150 Watts, 110/220V Switchable	45
PS200	200 Watts, 110/220V Switchable	70

CASES

CS100	XT Slide-In w/Hardware & Speaker	35
CS101	XT Slide-In w/Turbo, Reset Buttons/Lights	45
CS200	AT Slide-In w/Turbo, Reset, HD Button/Lights	75

MODEMS

MD100A	300/1200 BAUD Internal, Hayes Compatible	90
MD103	300/1200 BAUD External, Hayes Compatible	115
MD101A	1200/2400 BAUD Internal, Hayes Compatible	155
MD200	1200/2400 BAUD External, Hayes Compatible	200
MD100B	Hayes 1200 BAUD Internal	275

MONITORS

MM100	Samsung 12″	70
MM101	Hyundai Swivel	75
CM300	Samsung 14″ Color CD1464W	250
CM400	Magnavox 13″ Color CM8562	300
EG300	Samsung 14″ EGA 1453M1	360
EG201	Multisync II EGA	595

ACCESSORIES

AC100	Minicenter	60
AC101	6-Outlet Power Strip w/Surge Protector	20
AC102	Metal Keyboard Drawer	50
AC103	5¼″ Diskette Holder for 100	15
AC104	Eprom Writer for One	125
AC105	Printer Stand	25
AC106	Monitor Swivel Platform	145
AC107	Monitor Stand	15
AC201	12″ Keyboard Extension Cable	15
AC202	CPU Stand	25
CB100	6′ Printer Cable	15
CB101	12′ Printer Cable	20
DS100	3M 360K DS/DD	20
DS200	3M 1.2MB DS/HD	35
DS300	Sony 3½″ 720K DS/DD	30
DS400	Sony 3½″ 1.44MB DS/DD	80
JS100	IBM/Microsoft Joystick	25
MS100	Genius Mouse GM-6	75
MS300	Microsoft Mouse	150

TAPE BACKUPS

TB102	20MB, Internal Tallgrass 1020I	395
TB200	40MB, Internal Tallgrass 1040I	500
TB300	60MB, External Tallgrass 4060	975

Quantity Prices

PRINTERS

STAR

NP-10	NX-1000C Color
NX-10	NX-15
NX-10C w/Interface	ND-10
NL-10 w/o Card	ND-15
NX-1000	NR-15
NX-1000C	NB-15 24 Pin
NX-1000 Color	NB24-10 24 Pin

TOSHIBA

321 SL	P351 Model II
341 SL	

EPSON

LX800	LQ1000
FX86E	LQ2500
FX286E	GQ3500
EX800	LQ850
EX1000	LQ1050
LQ800	

CITIZEN

120 D	MSP-50
180 D	MSP-45
MSP-10	MSP-55
MSP-40	Premiere 35
MSP-15	Tribute 224

SEIKOSHA

SP 180Ai	MP 1300Ai
SP 180VC	MP 5300Ai
SP 1000VC	MP 5420Ai
SP 1200VC	SP Series Ribbon
SP 1200Ai	SK3000 Ai
SP 1200AS RS232	SK3005 Ai
SL 80Ai	800 CPS

BROTHER

M1109	
M1409	M1724L
M1509	HR20
M1709	HR40
Twinwriter 6 Dot & Daisy	HR60

PANASONIC

1080i Model II	3131
BUS 1091i Model II	3151
1092i	KXP 4450 Laser
1592	1524 24 Pin
1595	Fax Partner

OKIDATA

Okimate 20	193+
Okimate 20 w/Cart	292 w/Interface
120	293 w/Interface
180	294 w/Interface
182	393
192+	

Not responsible for typographical or pictorial errors.

Terribly Fast

BUS 286

$1,100

30-Day Money Back
20-Month Parts & Labor

Best Buy

SPECIFICATIONS

1. 100% IBM AT-Compatible
2. Fully Compatible Phoenix Bios Installed
3. Intel 80286-10 Running at Dual Speed 6 and 10 MHz
4. One MB RAM on Board
5. Memory Expandable to 16MB w/Add-On Memory Cards
6. One 12" High Res. Swivel-Based Amber Monitor (720x348)
7. Hercules Graphics Emulation Card w/Printer Port
8. Runs All MS-DOS Programs Including 1-2-3, Flight Simulator, Dbase III Plus, Autocad, WordStar, WordPerfect, etc.
9. Operates MS-DOS, PC-DOS, GW Basic, Novell, Xenix and Unix
10. Accepts All IBM Parts
11. 8 Expansion Slots: Six 16-Bit/Two 8-Bit
12. One Western Digital WD1003-WA2 Combined Hard Disk/FLoppy Disk Controller Controls Two Hard Disks and Two Floppies
13. Enhanced Keyboard w/LEDs, 101 Keys and Enlarged Return/Shift Keys
14. 200 Watts 110/220 VAC Power Supply w/Four Cables
15. Hardware Reset Button Installed
16. Turbo Button Installed
17. One Fujitsu 1.2MB Half-Height High-Density Floppy Disk (M2553K)
18. Real-Time Clock w/Battery-Backed CMOS Memory For System Configuration Data
19. One RS-232 Serial Card w/2nd Port Optional
20. Speaker Interface for Audio or Music Use
21. Power-On Self Testing of System Components
22. 80287 Math Co-Processor Socket Installed on Board
23. Nickel Plated, Enamel Coating, Heavy Duty, Lockable Case Serve also as Keyboard Lockout
24. Five Drive Slots Available for Five Half Height Floppy or Hard Disk Installations
25. Five Expansion Slots Available After Systems Configuration
26. Power Indicator Light Installed
27. Hard Disk Indicator Light Installed
28. Turbo Indicator Light Installed
29. Ready for OS/2 Systems Operations
30. Ready for 20-30-40-65-72-84-103-120-140MB Hard Disk Installations
31. Ready for 20-40-60MB Tape Backup Installation
32. Ready for Network Interface
33. Ready for Multiuser Interface
34. Ready for Multitasking Interface
35. Ready for Mouse/Joystick Interface
36. Fully Set-Up and Diagnostically Tested in America
37. Operating Manuals for Monitor, Keyboard, Motherboard, MGP Card, Serial Card and the Operator
38. 30-Day Money Back Guaranty
39. 20-Month Fully Warranted Labor and Parts
40. 72 Hours Burn-In Period
41. Ready for Immediate Delivery
42. Ship via UPS, Federal Express, APOs, FPOs
43. Worldwide Deliveries too

OPTIONAL FEATURES

1. 12 MHz "0" Wait w/100 Nanosecond RAM, SI = 13.3
2. 16 MHz "1" Wait Systems w/80 Nanosecond RAM, SI = 17.4
3. Baby Sized 286 w/Chip Technology VLSI Chip Set
4. VGA Systems w/Auto-Switch VGA Card (800x600)
5. EGA Systems w/Auto-Switch EGA Card (640x350)
6. Color Systems w/Color Card (640x200)
7. Hercules Graphics Plus Card and In-Color Card
8. Intel All Above Boards
9. Quadram Quad EGA Plus
10. ATI VGA Card and EGA Wonder Card
11. Everex Memory Expansion Board RAM 3000 Deluxe
12. Everex EVGA VGA Card
13. Genoa Super EGA
14. Video-7 VEGA Deluxe EGA
15. Paradise Autoswitch 480 EGA
16. AST Rampage, Advantage Premium, Sixpac Premium
17. NEC 13" Multisync II (800x560)
18. NEC 15" Multisync Plus (960x720)
19. NEC 19" Multisync XL (1024x768)
20. Magnavox Multiscan (926x580)
21. Samsung 14" 1453M1 EGA (640x350)
22. Magnavox CM8562 13" RGB Color Monitor
23. Samsung CD1464W 14" RGB Color Monitor
24. Green or Black/White Monitor
25. 14" Swivel-Based High Res. Amber Monitor
26. 14" Dual Frequency Amber Monitor
27. TEAC 5¼" 360K and 3½" 1.44MB Floppy
28. 1:1 Interleave Hard Disk Controller
29. ESSI (Enhanced Small System Interface) Controller Card
30. Tallgrass 20/40/60MB Tape Backup Systems
31. Hayes or Smart 1200 or 2400 BAUD Internal or External Modem
32. Epson, Toshiba, Citizen, NEC, and Star Printers
33. Microsoft or Genius Mouse and Joystick
34. Three Serial Ports Card w/Two Parallel Ports
35. Intelligent Serial Ports for 4 or 8 Users
36. Intel 80287-6/8/10 Math Co-Processor
37. Minicenter as shown
38. Vertical Tower Case w/Stand
39. Mini Case as shown (Minibus 286)
40. 2nd Serial Port Upgrade
41. 3M 5¼" DS/DD or DS/HD or Sony 3½" DS/DD Diskettes
42. Software of All Kinds Including Microsoft MS-DOS 3.3
43. Portable Systems with 9" EGA or Amber CRT Monitor
44. Portable LCD Systems with 600x400 or Gas Plasma Display
45. Laptop Systems with 20-30-40MB 3½" Internal Hard Disk
46. Multiuser or Networking Installations
47. On-Site Service Contract Available

Mini Center not included
second floppy not included

Price subject to change without notice

MINIBUS 286

Network/Multi-User Installations

HARD DISK SYSTEMS CONFIGURATIONS

AT120MM	BUS286 w/20MB, Seagate ST-225, 65MS	$1,450
AT130MM	BUS286 w/30MB, Seagate ST-238, 65MS	1,500
AT140MM	BUS286 w/40MB, Miniscribe 3650, 60MS	1,600
AT143MM	BUS286 w/43MB, Seagate ST-251, 39MS	1,700
AT144MM	BUS286 w/43MB, Seagate ST-251-1, 28MS	1,850
AT142MM	BUS286 w/42MB, Miniscribe 6053, 28MS	1,950
AT165MM	BUS286 w/65MB, Seagate ST-277, 39MS	2,000
AT172MM	BUS286 w/72MB, Miniscribe 6085, 28MS	2,300
AT184MM	BUS286 w/84MB, Seagate ST-4096, 28MS	2,400
AT1103MM	BUS286 w/103MB, Priam ID-100, 16MS	2,600
AT1120MM	BUS286 w/120MB, Miniscribe 6128, 28MS	2,700
AT1140MM	BUS286 w/Micropolis 1355, 23MS	4,000

FD102W	TEAC 5¼" Beige 360K FD102W	$ 80
FD201W	TEAC 5¼" Beige 1.2MB FD201W	95
FD302W	TEAC 3½" Beige 1.44MB FD302W	125
CMS	Samsung 14" Color Monitor/Color Card	175
CMM	Magnavox 13" Color Monitor/Color Card	225
EGS	Samsung 14" EGA/Everex Autoswitch EGA	400
EGM2	Multisync 2 EGA/Everex Autoswitch EGA	700
VGM2	Multisync 2 EVGA/Everex Autoswitch VGA Card	800

1-800-451-5279 (Outside N.Y.)
1-212-627-4485 (In N.Y.)
1-212-627-9884 (FAX line)
1-212-627-9872 (Tech Help)

VISA MasterCard AMERICAN EXPRESS Wire Transfer Money Order

BUS Computer Systems, Inc.
135 West 26th St., 8th Fl.
New York, New York 10001

Open 7 Days

Not responsible for typographical or pictorial errors.

Terribly Fast

BUS 386

$2,300

30-Day Money Back
20-Month Parts & Labor

Vertical Case

SPECIFICATIONS

1. 100% Compaq Compatible
2. Phoenix 386 or Award 386 Bios w/Setup Software
3. One MB Parity Checked Static Column RAM of 80-Nanosecond on Memory Card
   2–8 MB Piggy-Back Expansion Board Option, Allows Memory Expansion to 10mb Using 80-Nanosecond RAM Chips
   Fully Compaq Compatible Memory BUS
4. One 14" Swivel High Res. (720x348) Flat Screen Amber Monitor
5. Enhanced Keyboard w/LEDs, Enlarged Return/Shift and 101 Keys
6. Hercules Graphics Emulation Card w/Parallel Port
7. Intel 32-Bit 80386-16 Microprocessor
   — Operating at 16 MHz "0" Wait
   — Software Selectable of Four Speeds: 4.77/6/8/16
8. Performance Rating: MIPS = 2.03, SI = 18.7, Landmark = 20.5
9. 80287/80387 Math Co-Processor Socket Installed
   — 80387 is a 32-Bit Operation
   — 80387 is Bootable to DOS/SCO Xenix System V/OS/2/PC MOS 386
   — 80387 Runs with Turbo Pascal/Autocad Version 2.60/Full CAD/CAM Support
10. Eight Expansion Slots: 2 8-Bit, 5 16-Bit, 1 32-Bit
11. Operates OS/2, MS-DOS, PC-DOS, Unix V, Xenix, & Windows/386
12. Runs All MS DOS Software Including Lotus 1-2-3, Wordstar, Autocad, Flight Simulator, Dbase III Plus, Symphony, Etc.
13. Software Utilities Including:
    — Relocatable EGA and System Bios from ROM to RAM
    — Emulating the Lotus/Intel/Microsoft Expanded Memory Specification (LIM/EMS)
    — User Downloadable Bios
    — Software Selectable Speeds
14. Fully Compatible w/AT Mechanical Mounting Locations
15. Real-Time Clock w/Battery-Backed CMOS Memory for System Configuration Data
16. Three Address Modes:
    — 8086-Compatible Real-Address Mode
    — Protected 80286 Virtual Address Mode
    — Protected 80386 Virtual Address Mode
17. Sixteen Interrupts
18. Seven Direct Memory Access (DMA) Channels
19. 64 Terabytes of Virtual Address Space
20. 32-Bit Internal Address BUS and Memory Interface
21. Hardware Fixed-Point Multiply and Divide
22. AT Compatible I/O Channel Timing
23. Pipelined Instruction Execution
24. 8742 Keyboard Controller Interface an AT Keyboard
25. 200 Watts 110/220 VAC Power Supply w/Four Cables
26. One Fujitsu 1.2MB ½ Height High Density FD (M2553K)
27. One Everex Magic I/O (EV-170) w/One Parallel and One Serial Port, 2nd Serial Port Optional
28. One Western Digital WD1003-WA2 Combined Hard Disk/Floppy Disk Controller Controls Two Hard Disks and Two Floppies
29. Speaker Interface Provided
30. LED Indicator Lights for Turbo Speed/Hard Disk/Power Installed
31. Hardware Reset and Turbo Buttons Installed
32. Nickel Plated, Enamel Coating, Heavy Duty, Lockable Case
33. Five Drive Slots Available for Five Half Height Floppy or Hard Disk Installation
34. Power-On Self Testing of System Components
35. Five Slots Still Left Open After Systems Configuration
36. Ready for OS/2 Systems Operations
37. Ready for 20-30-40-65-72-84-103-120-140-230-337MB Hard Disk
38. Ready for 20-40-60MB Tape Backup Installation
39. Ready for Network/Multi-User/Multi-Tasking Systems
40. Ready for Network File Servers
41. Ready for Mouse/Joy Stick Interface
42. Operating Manuals for Monitor, Keyboard, Motherboard, MGP Card and Magic I/O Card
43. 30-Day Money Back Guaranty
44. 20-Month Fully Warranted Labor and Parts
45. Fully Set-Up and Diagnostically Tested in America
46. 72 Hours Burn-In Period
47. Ready for Immediate Delivery
48. Ship via UPS, Federal Express, APOs, FPOs
49. Worldwide Deliveries too

OPTIONAL FEATURES

1. 20 MHz Systems w/Intel 80386-20 Microprocessor w/MIPPS = 2.83, SI = 23.0, Landmark = 25.5
2. 25 MHz Systems Will Be Available Soon
3. Baby Sized 386 w/Cache Memory of 35-Nanosecond RAM
4. RAM Expansion Board of 2MB, 4MB, 6MB, and 10MB
5. Twin Bioses Phoenix 386/Award 386 on Motherboard
6. VGA Systems w/Auto-Switch VGA Card (800x600)
7. EGA Systems w/Auto-Switch EGA Card (640x350)
8. Color Systems w/Color Card (640x200)
9. Hercules Graphics Plus Card and In-Color Card
10. All Intel Above Boards
11. ATI VGA Card and EGA Wonder Card
12. Everex EVGA VGA Card
13. Quadram Quad EGA Plus
14. Genoa Super EGA
15. Video-7 Vega Deluxe EGA
16. Paradise Autoswitch 480 EGA
17. AST Rampage, Advantage Premium, Sixpac Premium
18. NEC 13" Multisync II (800x560)
19. NEC 15" Multisync Plus (960x720)
20. NEC 19" Multisync XL (1024x768)
21. Magnavox Multiscan (926x580)
22. Samsung 14" 1453M1 EGA (640x350)
23. Magnavox CM8562 13" RGB Color Monitor
24. Samsung CD1464W 14" RGB Color Monitor
25. Green or Black/White Monitor
26. 14" Dual Frequency Amber Monitor
27. TEAC 5¼" 360K and 3½" 1.44MB Floppy
28. 1:1 Interleave Hard Disk Controller
29. ESSI (Enhanced Small System Interface) Controller Card
30. Tallgrass 20/40/60MB Tape Backup Systems
31. Hayes or Smart 1200 or 2400 BAUD Internal or External Modem
32. Epson, Toshiba, Citizen, NEC, and Star Printers
33. Microsoft or Genius Mouse and Joystick
34. Three Serial Ports Card w/Two Parallel Ports
35. Intelligent Serial Ports for 4 or 8 Users
36. Intel 80387 Math Coprocessor
37. 386 High Speed Game Card and Printer Stand
38. Mini Case as Shown (Mini 386)
39. Minicenter or Vertical Case as shown
40. 2nd Serial Port Upgrade
41. 3M 5¼" DS/DD or DS/HD or Sony 3½" DS/DD Diskettes
42. Software of All Kinds Including Microsoft MS-DOS 3.3
43. Portable Systems with 9"EGA or Amber CRT Monitor
44. Portable LCD Systems with 600x400 or GAS Plasma Display
45. Laptop Systems with 20-30-40MB 3½" Internal Hard Disk
46. Multiuser or Networking Installations
47. On-Site Service Contract Available

mini center not included

Price subject to change without notice

MINIBUS 386

Network/Multi-User Installations

HARD DISK SYSTEMS CONFIGURATIONS

TT1120MM	BUS386 w/20MB, Seagate ST-225, 65MS	$2,550
TT130MM	BUS386 w/30MB, Seagate ST-238, 65MS	2,600
TT140MM	BUS386 w/40MB, Miniscribe 3650, 60MS	2,650
TT143MM	BUS386 w/43MB, Seagate ST-251, 39MS	2,800
TT144MM	BUS386 w/43MB, Seagate ST-251-1, 28MS	2,900
TT142MM	BUS386 w/42MB, Miniscribe 6053, 28MS	3,000
TT165MM	BUS386 w/65MB, Seagate ST-277, 39MS	3,050
TT172MM	BUS386 w/72MB, Miniscribe 6085, 28MS	3,200
TT184MM	BUS386 w/84MB, Seagate ST-4096, 28MS	3,250
TT1103MM	BUS386 w/103MB, Priam ID-100, 16MS	3,400
TT1120MM	BUS386 w/120MB, Miniscribe 6128, 28MS	3,500
TT1140MM	BUS386 w/Micropolis 1355, 23MS	4,400
TT1230MM	BUS386 w/Priam ID-230, 12MS	4,800
TT1337MM	BUS386 w/Priam ID-337, 15MS	6,200

FD102W	TEAC 5¼" Beige 360K FD102W	$ 80
FD201W	TEAC 5¼" Beige 1.2MB FD201W	95
FD302W	TEAC 3½" Beige 1.2MB FD302W	125
CMS	Samsung 14" Color Monitor/Color Card	175
CMM	Magnavox 13" Color Monitor/Color Card	225
EGS	Samsung 14" EGA/Everex Autoswitch EGA	400
EGM2	Multisync 2 EGA/Everex Autoswitch EGA	600
VGM2	Multisync 2 VGA/Everex Autoswitch VGA	800

1-800-451-5279 (Outside N.Y.)
1-212-627-4485 (In N.Y.)
1-212-627-9884 (FAX line)
1-212-627-9872 (Tech Help)

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BUS Computer Systems, Inc.
135 W. 26th St., 8th Fl.
New York, New York 10001
Open 7 Days

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BUS PORTABLES

Terribly Fast

88/286/386

8/10/16 MHz
10/12/20 MHz Optional

30-Day Money Back
One Year Labor & Parts

SPECIFICATIONS

1. 9" High Res. (750x348) Dual Frequency Amber CRT Monitor Accepts Both Mono and Color Card
2. Three Half Height Drive Slots
3. Reinforced Aluminum Frame
4. 200 Watts 110/220 VAC Power Supply
5. 7 Expansion Slots Available
6. 84 Keys w/LEDs for CAP, Num and Scroll Lock
7. Enlarged Return and Shift Keys
8. Mechanical Keyswitch of Clicking Feel w/A Positive Tactile Feedback
9. Power Lock Key Installed
10. Contrast Adjusting Knob Installed
11. Brightness Adjusting Knob Installed
12. Turbo Speed Light Indicator Installed
13. Hardware Reset Button Installed
14. Dimensions: 17.3"(W) × 8.2"(H) × 16.9"(D)
15. Weighs 22 lbs in CKD Form
16. EGA Portables Avaialble Now:
    — 9" EGA Monitor w/640x350 (EGA) or 640x200 (CGA)
    — 230 Watts 110/220 VAC Power Supply
    — Dot Pitch: 0.28

OPTIONAL FEATURES

1. TEAC 5¼" 360K Floppy Disk
2. TEAC 3½" 720K Floppy Disk
3. TEAC 3½" 1.44MB Floppy Disk
4. Seagate 3½" Hard Disk of 20/30/40 MB
5. Hercules Graphics Plus Card or In-Color Card
6. Intel All Above Boards
7. Quadram Quad EGA Plus
8. Everex EV 657 Autoswitch EGA
9. Paradise Autoswitch 480 EGA
10. ATI EGA Wonder
11. Genoa Super EGA
12. Video-7 Vega Deluxe EGA
13. AST Advantage Premium, Sixpac Premium, Rampage
14. Everex Ram Expansion Boards
15. Hayes or Smart 1200 Baud Internal or External Modem
16. Hayes or Smart 2400 Baud Internal or External Modem
17. Microsoft or Genius Mouse
18. Winner Joystick
19. Intel Math Coprocessor
20. 2nd Serial Port Upgrade
21. Epson, Toshiba, Citizen, NEC, and Star Printers
22. Tallgrass Tape Backup of 20/30/40 MB
23. Portable Carrying Bag

Best Buy

CONFIGURATIONS

XT200PX	BUS88 Portable	$1.050
	Configured Same as BUS88 w/Two 360K	
XT120PX	w/20MB, Seagate ST-225, 65 MS, One 360 K	1.350
XT130PX	w/30MB, Seagate ST-238, 65 MS, One 360K	1.400
XT140PX	w/40MB, Miniscribe 3650, 60 MS, One 360K	1.450
XT165PX	w/65MB, Seagate ST-277, 39 MS, One 360K	1.750
AT100PX	BUS286 Portable	1.650
	Configured Same as BUS286 w/One 1.2MB	
AT200PX	w/One 1.2MB and One 360K	1.700
AT120PX	w/20MB, Seagate ST-225, 65 MS, One 1.2MB	1.900
AT130PX	w/30MB, Seagate ST-238, 65 MS, One 1.2MB	1.950
AT140PX	w/40MB, Miniscribe 3650, 60 MS, One 1.2MB	2.000
AT143PX	w/43MB, Seagate ST-251, 39 MS, One 1.2MB	2.200
AT144PX	w/43MB, Seagate ST-251-1, 28 MS, One 1.2MB	2,300
AT142PX	w/42MB, Miniscribe 6053, 28 MS, One 1.2MB	2.400
AT165PX	w/65MB, Seagate ST-277, 39 MS, One 1.2MB	2.450
AT172PX	w/72MB, Miniscribe 6085, 28 MS, One 1.2MB	2.600
AT184PX	w/84MB, Seagate ST-4096, 28 MS, One 1.2MB	2.650
AT1103PX	w/103MB, Priam ID-100, 25 MS, One 1.2MB	2,800
AT1120PX	w/120MB, Miniscribe 6128, 28 MS, One 1.2MB	2.900
TT100PX	BUS386 Portable	3.100
	Configured Same as BUS386 w/One 1.2MB	
TT200PX	w/One 1.2MB and One 360K	3,150
TT120PX	w/20MB, Seagate ST-225, 65 MS, One 1.2MB	3,350
TT130PX	w/30MB, Seagate ST-238, 65 MS, One 1.2MB	3.400
TT140PX	w/40MB, Miniscribe 3650, 60 MS, One 1.2MB	3.450
TT143PX	w/43MB, Seagate ST-251, 39 MS, One 1.2MB	3.600
TT144PX	w/43MB, Seagate ST-251-1, 28 MS, One 1.2MB	3,700
TT142PX	w/42MB, Miniscribe 6053, 28 MS, One 1.2MB	3.800
TT165PX	w/65MB, Seagate-277, 39 MS, One 1.2MB	3.850
TT172PX	w/72MB, Miniscribe 6085, 28 MS, One 1.2MB	4,000
TT184PX	w/84MB, Seagate ST-4096, 28 MS, One 1.2MB	4,050
TT1103PX	w/103MB, Priam ID-100, 16 MS, One 1.2MB	4.200
TT1120PX	w/120MB, Miniscribe 6128, 28 MS, One 1.2MB	4,300
TT1140PX	w/140MB, Micropolis 1355, 23 MS, One 1.2MB	5,200
TT1230PX	w/230MB, Priam ID-230, 12 MS, One 1.2MB	5,600
TT1337PX	w/337MB, Priam ID-337, 15 MS, One 1.2MB	7,000

All BUS Computer Systems Feature:

- Operating Manual for Monitor, Keyboard, Motherboard, MGP, Multi I/O, Serial Cards
- Fully Set-Up and Diagnostically Tested in America
- 72 Hours Burn-In Period
- 30-Day Money Back Guaranty
- One Year Fully Warranted Labor & Parts
- Shipping Via UPS
- We Ship APOs and FPOs too
- Ready for Immediate Delivery

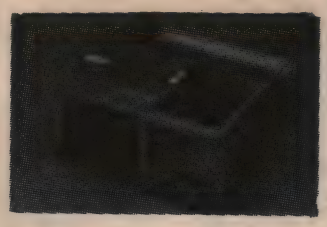
1-800-451-5279 (To Order)
1-212-627-4485 (In N.Y.)
1-212-627-9884 (FAX line)
1-212-627-9872 (Tech Help)

VISA MasterCard AMERICAN EXPRESS Wire Transfer Money Order

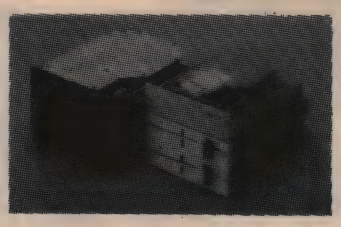
BUS Computer Systems, Inc.
135 West 26th Street, 8th Fl.
New York, New York 10001

Open 7 Days

Price subject to change without notice

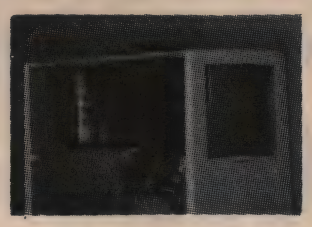


Reinforced Aluminum Frame



Three Half-Height Drive Slots

Network/Multi-User Installations



7 Expansion Slots Available

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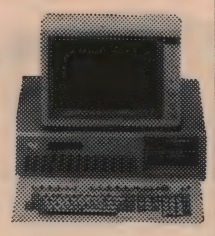
BELTRON GIVES YOU MO

With special low prices on quality IBM compatible systems . . .

XT TURBO

- AT/XT Case w/Speaker
- 150W Power Supply
- 4/10MHz Turbo Motherboard w/640K and Bios
- Multi I/O
- Two 360K Floppy Drives
- AT-style XT Keyboard
- Monographics Adaptor
- Tilt/swivel Monochrome Monitor

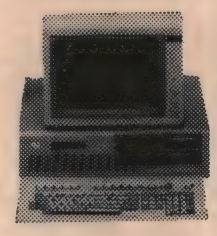


$40 MONTH

BELTRON C.O.D. PRICE: $791.00

XT TURBO/20

- AT/XT Case w/Speaker
- 150W Power Supply
- 4/10MHz Turbo Motherboard w/640K and Bios
- Multi I/O
- Two 360K Floppy Drives
- 20MB Hard Drive w/Controller
- AT-style XT Keyboard
- Monographics Adaptor
- Tilt/swivel Monochrome Monitor

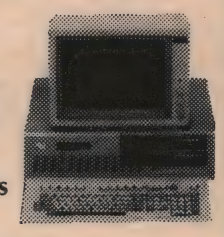


$45 MONTH

BELTRON C.O.D. PRICE: $1,070.00

XT TURBO/20/COLOR

- AT/XT Case w/Speaker
- 150W Power Supply
- 4/10MHz Turbo Motherboard w/640K and Bios
- Multi I/O
- Two 360K Floppy Drives
- 20MB Hard Drive w/Controller
- AT-style XT Keyboard
- Color Graphics Adaptor
- RGB Color Monitor



$45 MONTH

BELTRON C.O.D. PRICE: $1,250.00

EASY FINANCING

The above products are fully assembled, tested, with export shipping box and have a 90 DAY unconditional warranty.

INSTANT REVOLVING CREDIT

XT TURBO/20/EGA

- AT/XT Case w/Speaker
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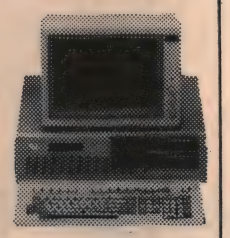

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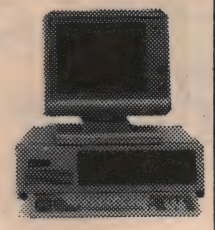

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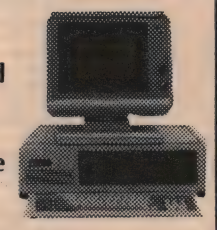

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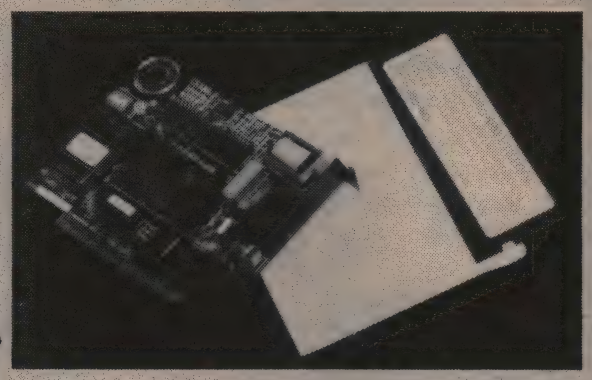

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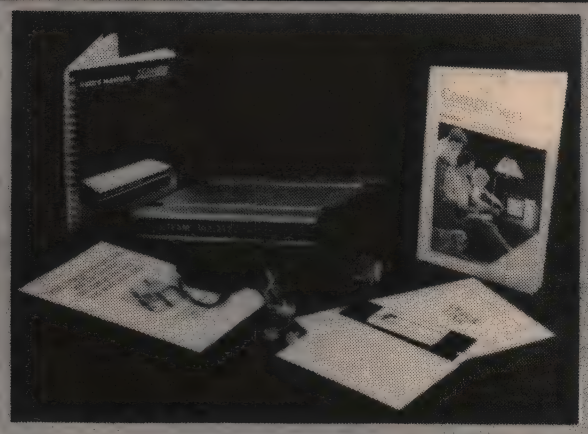

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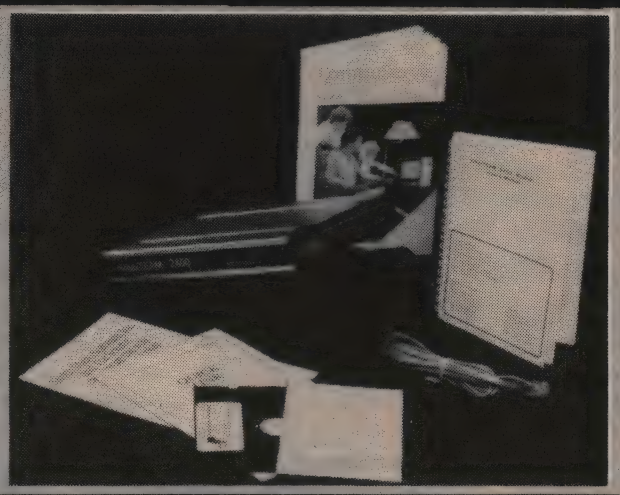

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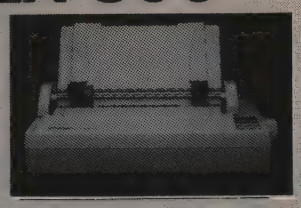

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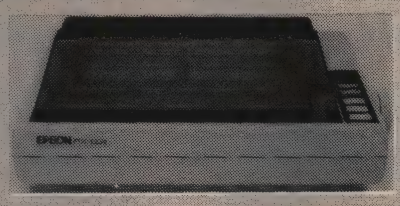

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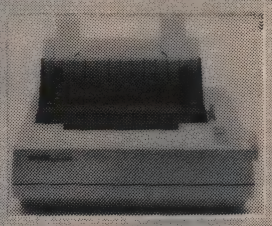

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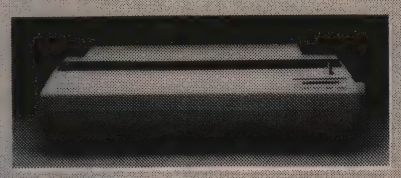

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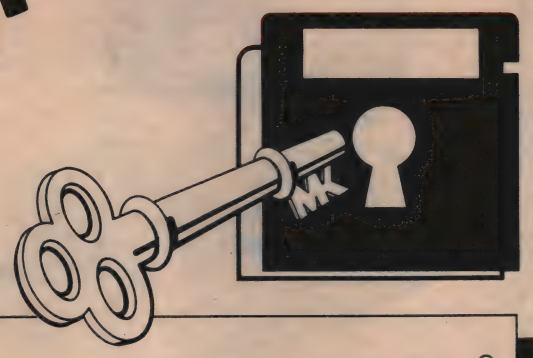


```
C:>DEBUG PROGRAM.COM
-D100 136
8848:0100  EB 18 49 6E 63 6F 72 72-65 63 74 20 44 4F 53 20  k.Incorrect DOS
8848:0110  76 65 72 73 69 6F 6E 0D-0A 24 50 B4 30 CD 21 86  version..$P40M!.
8848:0120  E0 3D 36 01 72 05 3D 0A-02 76 09 BA 02 01 B4 09  `=6.r.=..v.:..4.
8848:0130  CD 21 CD 20 58 EB 2F                             M!M Xk/
-Q
```

turn this into this!

```
H00100: JMP     Short H0011A                    ;00100 EB18          __
;-------------------------------------------------
        DB      "Incorrect DOS version"         ;00102 496E636F727265
        DB      0Dh                             ;00117
        DB      0Ah                             ;00118
        DB      "$"                             ;00119 24
;-------------------------------------------------
H0011A: PUSH    AX                              ;0011A 50            P
        MOV     AH,30h                          ;0011B B430          _0
        INT     21h            ;1-DOS_Ver_Number;0011D CD21          _!
        XCHG    AH,AL                           ;0011F 86E0          __
        CMP     AX,0136h                        ;00121 3D3601        =6_
        JB      H0012B         ; . . . . . .    ;00124 7205          r_
        CMP     AX,020Ah                        ;00126 3D0A02        =__
        JBE     H00134         ; . . . . . .    ;00129 7609          v_
H0012B: MOV     DX,0102h                        ;0012B BA0201        ___
        MOV     AH,09h                          ;0012E B409          __
        INT     21h            ;1-Display_String;00130 CD21          _!
        INT     20h            ;TERM_normally:20h;00132 CD20         _
;-------------------------------------------------
H00134: POP     AX                              ;00134 58            X
        JMP     Short H00166                    ;00135 EB2F          _/
;-------------------------------------------------


MASTER*KEY XREF - PROGRAM.XRF                                  Page 1

0102h                   :   121   2F5   301   320
020Ah                   :   126
03CBh                   :   12B
1-Display_String        :   130   591   610
1-DOS_Ver_Number        :   11D
H00100                  :   100
H0011A                  :   100   11A
H0012B                  :   124   12B
H00134                  :   129   134
H00166                  :   135
TERM_normally:20h       :   132
```

NOTE: The cross-reference is by memory location within the program file!

NOTE: The output is totally Microsoft MASM-compatible.

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FEEDBACK FORUM

Letters From Our Readers

Dear Editor:

In response to the two letters in the Feedback Forum in the July 1987 edition concerning converting Commodore files from 64s to 128s into the MSDOS format, I may be able to save your readers a lot of time.

The Big Blue Reader by S.O.G.W.-A.P. Software Inc. will convert files from 64s and 128s to MSDOS format very quickly and easily. The program requires a Commodore 128 and at least one (1) 1571 drive. I recommend two (2) or one (1) 1571 and one (1) 1541. The program will convert sequential or program file formats and will work in 40 or 80 column modes. It converts PET ASCII to standard ASCII quickly and will insert line feeds if requested. It will format MSDOS disks as well, in single or double sided, eight (8) or nine (9) sector formats. With a retail price of $70.00 it has paid for itself several times over in time savings alone for several of my clients. In their case they had C-64s. We rented a 128 and two (2) 1571 drives for a week. We were able to convert over 4,000,000 bytes of data in a very short time.

For more information contact: The Big Blue Reader by S.O.G.W.A.P. Software Inc., 611 Boccaccio Ave., Venice, CA 90291; (213)822-1138.

Jeff Daly
Ames, IA

Thank you for this information. According to those who have used Big Blue Reader, it's a good way to transfer data from Commodore to IBM disks.

Dear Editor:

I am looking for an enhanced, 101 keyboard, AT/XT style to replace the 94 AT style keyboard that came with the Tandy 1200 HD computer I have. Is there a "best buy" bargain offered by any of your advertisers in *Computer Shopper*? If there is one that also has the "click style" sound, that would be OK.

Can you help me in this matter?

Sidney Barasch
Uniontown, PA

There are now several sources of 101 key enhanced style keyboards that advertise in *Computer Shopper*. One such source is Northgate Computer Systems, whose "C/T-101" sells for $99 plus shipping. Contact them at 800-453-1400.

Dear Editor:

I have been following your magazine and its advertising of discontinued portable computers for over a year now and finally decided to take the plunge. I was going to select the Sharp 5000, but then I saw the ad for the NEC (8401A-LS) from Damark International. I called both companies and discovered that the NEC priced at $298 plus shipping included the exact four programs that I wanted while the Sharp had only the O.S. and BASIC and each additional program cost an average of $100. It seemed to me that the NEC was the better bargain for me, but I would like to have any information you have concerning these two portables and to get your magazine's opinion of the NEC as a possible best buy. Also if you have any reader reports positive or negative that would help me decide, it would be greatly appreciated.

Keep up the great work and continue to let the "common man" know the real facts and where to get the most for his money. Thank you for your time and effort.

Nelson Crandall
Monroeville, AL

The NEC Starlet is a fine CP/M based laptop, which is now being liquidated by several sources, including advertisers in *Computer Shopper*. If the built-in ROM programs are adequate for your needs, it may be a reasonable alternative to the Sharp 5000. If, however, you need MSDOS or PC compatibility, you may wish to consider one of the new, lower priced, PC compatible laptops, such as the Toshiba 1000, or Sharp 4501. They not only run most PC software, they also have an internal 3.5 inch floppy drive. That is an option not included on laptops such as the Starlet.

Dear Editor:

I recently purchased a Zenith computer model ZF 148-42 as a special package from Zenith to the university I attended. After the purchase, I realized the need for a hard disk and purchased a Seagate 238R with the RLL controller. Because of the lack of expansion slots in the 148, I have not been able to make use of the hard disk. Do you have a solution to this problem or a method of installing the disk and controller? Is there an expansion kit that will allow me to increase the number of slots in my computer? Any ideas on how I can expand my system? Thank you.

Todd L. Smith
APO, NY

The Z-148 can be expanded to a two-slot system with the installation of a special slot expander board. (With the addition of an external chassis, it can also be expanded to an 8-slot system.) The two-slot expander, including an on-board clock, sells for $129, and is available from Payload Computer Services, (713)486-0687. The external chassis is available from UCI Corp., (800)824-2667.

Dear Editor:

Your March editorial struck a chord. I too started out with Apple several years ago, and later bought an MSDOS clone. The reason I switched may be of interest to your readers.

I bought my first "personal " computer several years ago, shortly before IBM joined the "micro" market with their first PC. At that time, in the area where I live, the choice was very limited. I talked to owners of Atari and Commodore computers, and decided that they were both too limited. Those limitations had to do with the difficulty that I saw for expansion. I bought an Apple II + .

Imagine, if you will, going from looking at a computer that is a factory-sealed box—to buying one that is designed with a removable top and the wonder of no less than eight slots for expansion cards. Even after adding a printer interface, a disk drive controller and a memory expander to reach the maximum 64K, I would still have five slots left open for the future. A "test drive" in the store using some of the software available, and the decision was as easy as that.

In the world of "big" computers, where I have worked for several years, IBM is very well-known for the legendary IBM marketing skills. I think that IBM, when they decided to enter the "small" computer market, looked long and hard at the factors that had made Apple very successful in the home and small business markets, and which were very likely to open the big business doors that had always been open only to companies like IBM. It should not take a marketing genius to figure out that IBM would decide to include the best ideas of their (potential) competitors' machines in their own new offering.

One of the key factors in Apple's success was the "open" nature of the little box they sold. If you are new to computers, meaning if the first microcomputer you ever purchased was an IBM PC or one of the many clones, you may have little thought for what a powerful idea that openness is. Once you make your original purchase, you are no longer wedded to the maker of your computer. You may now shop around for the best value when the day comes that you want to add some new features to your computer. These days, you even have a lot of choice when you are looking to make that first purchase of your BASIC system. Whatever else may have gone into IBMs decision, I think that the successes Apple was having with their open design had a lot to do with the basic architecture of the PC finally released by IBM. Without the example that Apple gave, I think it's very likely that the "proprietary" architecture we are now seeing in the PS/2 would have been the design style of the original IBM PC. Among other things clones would not be as readily available as they are now, and you probably would not have this very magazine to read.

I bought my Apple II + with 64K of memory, one disk drive, monochrome monitor, and 120 CPS matrix printer for the princely sum of $2000—which included a word processing program! Today...well...I have just replaced an XT clone with a '386 computer for not much more than the cost of that original Apple. A couple of years later, the student in my house needing more computer time for reports and other school work, I decided it was time to buy a second computer.

IBM had joined the microcomputer market by then but, due to IBMs high cost, my money went for an Apple IIe with several enhancements from add-on vendors. My employer, however, had a larger budget than I did and bought IBM all the way. Since we were in the process of spending several million dollars on a mainframe from IBM I was not at all surprised that "little" IBMs started showing up on desktops.

The early IBM PC, and the software that was available for it during those first few months, was nothing very special. I could, and did, still compute rings around the lucky users who were given access to the first PCs purchased. My feeling of superiority began to wear thin the day the first Lotus 1-2-3 disk was loaded on a PC at work. I had a spreadsheet on my Apple—but those macros! That was my first inkling that software would draw me toward buying an MSDOS computer.

Using IBMs at work convinced me that someday, I would own a machine that would run Lotus. Years passed. A real IBM was still beyond my budget. Every time the price came down, it was because a new model had been issued that contained features that I just "had" to have. So, I waited. I did notice that a new factor, a growing body of "clone" PCs sold by a number of makers, had entered the price and performance equation.

Late in 1986 my church needed to replace the Apple II + it had out grown. (Yes, I am the one who recommended the Apple + in the first place.) The reason we had outgrown the Apple + was not some direct limitation of the computer. Instead, we had reached the outer limits of the program we had purchased for management of the members and their donations. I first thought about upgrading to a IIe, or to the then new IIgs. I finally decided that it was time for a switch.

I just could not find an Apple program that would work. I was even willing to write my own program, but could not find a language and compiler

continued on page 178

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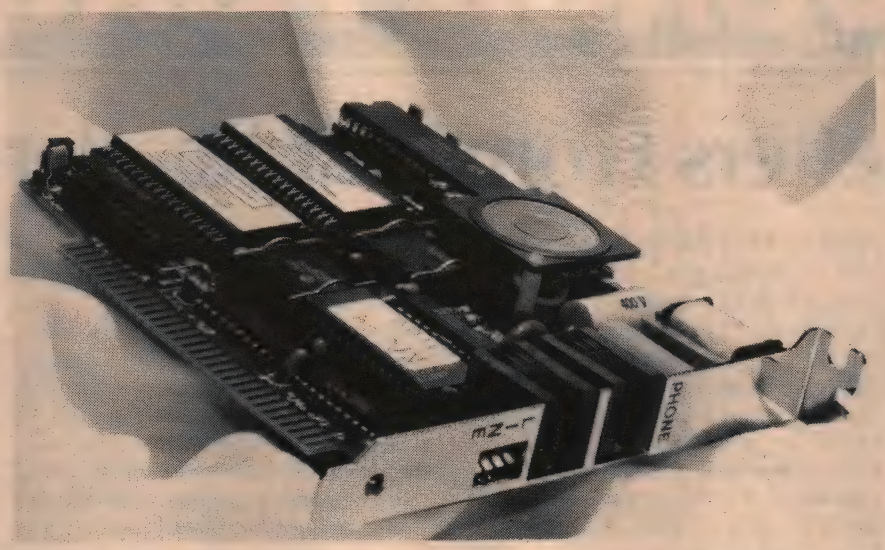
Holmes Microsystems, the largest Laptop internal modem manufacturer in the industry, has entered the desktop modem segment with an outstanding product offering. The Correspondent DT-2400 and the Correspondent DT-2400EC has been designed to add 2400 bps telephone transmission capabilities to the IBM PC/XT/AT, compatibles and also to the IBM PS/2 Series Product family.

Holmes' new line of desktop modems if fully compatible with Hayes. It is 300/600/1200/2400 bps, auto dial, auto answer modem, that is also speed upgradable to 4800 and 9600 baud. At 2400 bps it is async CCITT V.22bis compatible. The DT-2400EC model adds error correction capabilities to the



DT-2400 model. As it is traditional with all other modems offered by Holmes Microsystems, in spite of their aggressive pricing, the modems include a free fully compatible Mirror II software package, with a complete AT command set.

Holmes Microsystems manufactures and markets products for Toshiba, Zenith, NEC, Datavue, IBM and other leading laptop computers, including disk drives, memory systems and other expansion products. Interested national and international parties can contact the company by dialing 1-800-443-3034 within the U.S.A., by writing to Holmes Microsystems, 2620 South, 900 West, Salt Lake City, Utah 84119, or by fax at 801-975-9726. ●

Letters From Readers
continued from page 177

to match the power of dBase III + and Clipper that I used on the IBMs where I work. This was the clincher. People writing the business-type programs were now devoting their time to MSDOS, which meant that I could not expect to find what I needed on an Apple.

Finally, the chance I had been waiting for, for years—I could buy an IBM-type computer. Actually, I bought two of them! The best part was that I was able to buy both computers for the same total of $2000 that I had once spent on only one computer.

I started my search for a new computer by looking through the advertising in several magazines I receive at work, plus *Computer Shopper* that I receive at home. I read many articles, reviewing one brand and another, and made a list containing all the features I wanted. I knew from experience with real IBMs at work that 640K of memory and a hard disk were both needed. I also decided that monochrome was the only display I could afford, that would also be easy enough on the eyes for several hours a day of work. CGA color may be nice for games or casual use, but it is not very good for word processing or other use that involves a text-based program or menu system. EGA was way over my budget.

My list of features completed, I set to work comparing prices. At that time, I found that I would have to spend "about" $800 for the computer I needed to purchase for my church, which allowed for using the existing printer. I would then have to spend about $1100 for one for myself, since I also had to buy a printer for mine. (I still have both Apple systems in operation.) Just before calling a mail order dealer I checked in the local paper, on the chance that I could buy at least one of the machines from someone who had realized that you were actually required to feed all the data into the computer before those wondrous reports would come out the other end.

I did not find any used clones in the paper, and the used IBMs were still way over what I would have to pay for a new clone, but I did discover that a new retail market had started while I had not been paying attention. I don't know about your area, but I can state that Portland, Oregon (about one million population in the metropolitan area) has a thriving industry of dealers selling several brands of clone computers A few dealers, for the "basic" machine that is a clone of the IBM XT configuration, even match the mail order prices.

The store I finally settled upon dealt exclusively in a computer built around a motherboard imported from Taiwan, produced by the DTK company. I still don't know what DTK stands for, as the sales staff don't seem to know either. In any event I was able to buy a computer for just over $800 that had the following features:

—640K of 120ns memory, to be able to run at a 10MHz "Turbo" speed;

—a 360K floppy drive and a 20Meg Seagate ST-225 hard disk;

—amber monitor with a Hercules-compatible card and a parallel port;

—cable to connect the parallel port to the old printer.

While talking to the sales staff at the store I did find out something about the origins of the motherboard in the computer. During power-up the clone displays DTK Corp. COMPUTER /88 on the top of the screen, and DTK/ERSO/BIOS 2.33 (C) 1986 on line two. While I still don't know the meaning of DTK, I have discovered that ERSO stands for the Electronic Research and Service Organization—a quasi-governmental agency established by the Taiwanese government to aid their computer industry. So, whatever DTK really means, at least a part of their design work was actually done for them by the R&D arm of their government. Since buying my DTK clone I have run across at least one other component, purchased from a mail order dealer, that was made by DTK for use as a general purpose expansion card. I have no idea how big DTK is in Taiwan, but they seem to have their products in many different sales channels on this side of the ocean. So, for a total of just about $2000, I was able to buy one complete computer system plus another that had everything except a printer.

My decision to switch from Apple to MSDOS was totally driven by needs that could not be met by software available for the Apple. I know that by using bank switching techniques it is possible to use a megabyte (or more) of memory in an Apple IIe (I have two 1Meg cards in the IIe my wife now uses) but it just seems that developers are not writing the same types of software for Apple that they are for MSDOS. I finally wrote a program for my church myself, using the dBase III + language (dBXL did fine) and then compiled it with Clipper. If two programs such as that combination had been available for the Apple, I would be writing to tell you about how the Apple was still a viable solution for business needs. Since that combination, or one like it, does not exist for Apple—it is not a good business solution.

Tom Smith
Fort Vancouver, WA

It is said that this business is software driven and your letter illustrates this point. However, the improved software can only run on computers with a much larger memory and hard disk data storage.

Just around the corner are new computers with multi-megabytes of memory and hundreds of megabytes of disk storage. New manufacturing techniques will allow them to be priced at the same levels as our current equipment.

Dear Editor:

A year ago I purchased a Xerox 6064; an 8Mz XT compatible (8086 CPU) with 2 360K floppies, 512K, 7 expansion slots and a monochrome monitor for $950. I have since added a 21MB hard card. I have 5 of the 7 expansion slots left.

I have had no problems running any IBM software. My monitor has a resolution of 600x400 and acts like a color monitor in every way except that it is not a color monitor. The local Xerox service center tells me only a Xerox color monitor will work. The manuals have no technical information on the hardware itself.

I am considering adding a Samsung RGB or EGA color monitor. Maybe you could find out what type of color monitor my system will support. Any other information on the Xerox 6064 would also be appreciated.

Don Meyer
Pittsburgh, PA

The video on your machine is proprietary and is not compatible with standard monitors. You need a Xerox color monitor.

Dear Editor:

I am an entrepreneur that has been looking for a particular piece of equipment for the last 3 years. I was told a year or so ago that technology had not progressed to the level that I required in order to find the equipment. However, I believe technology may be in order now. The problem is I don't think anybody has established a market for the product yet.

I need to find a printer that can be directly hooked into a modem. My desire is to sit in Anchorage, type a letter, send it through the modem to a distant location, download to their modem. That modem would need to be able to send the information directly to the printer in text form without a computer. I realize that the printer would require some sort of CPU for it to be able to handle the communicated material—but I wouldn't think it would require a very large CPU.

I would like to be able to print at distant stations without my clients having to fool with knowing how to run Lotus, or dBase III, Wordstar, Displaywrite III, etc. I would like to do their accounting and print in their office without them having to know anything about operating a computer. All I want them to know how to do is load their paper and hit start!

Can you help? Is technology around? Where? If not, who could I contact that could possibly design a prototype (cheap) for a percentage of a market?

Any help you could give me would be appreciated. I have no idea where to start.

Brenda Yount
Anchorage, AK

The technology is over 60 years old! It's called the teletype! RCA and others now make terminals with built-in modems that connect to a printer. The problem is that without a computer you also have no memory or data storage. Computers have become so cheap that omitting one is poor judgement. ●

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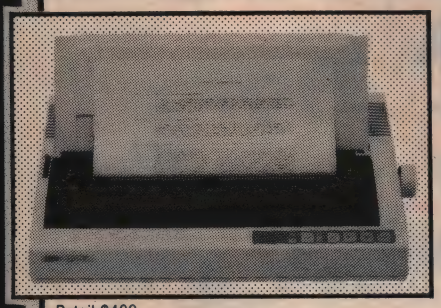

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Programming Watson

by Ronald G. Albright, Jr., M'

Pity the poor doctor? I know I won't get too many tears and offer for contributions for the medical profession, but, believe me—it's getting tough out there. With medical schools churning out doctors at record rates, the competition for the patient dollar is becoming intense. For the first time perhaps ever, such concerns as marketing and public relations are moving to the attention of the health profession.

While I am relatively sheltered from these concerns (I work for the government and have a relatively "captive" patient population), my colleagues are not. I got a call recently from a doctor friend in Arkansas. He is a cardiologist (a heart specialist) in a medium sized town and in solo practice. His competition is a large group of a dozen or so specialist whose pooled resources and facilities far exceed my friend's. Besides that, as a group, they were able to advertise openly in newspapers and on television and radio. My friend, in practice by himself, was forbidden by the "ethics" of the prominent and powerful medical societies to openly advertise his service. Anything beyond a blurb in the Yellow Pages is considered a breech of ethics in our profession. His practice was falling off. He said it was time to "play hardball" and start thinking about aggressively marketing his practice. He wanted my ideas on how a computer might help.

In one of my rare fits of semi-original thinking, I came up with an idea that is currently implemented and serving my friend's practice quite well as a superb public relations tool and is even getting some notice from the strategically distributed press releases we put together. His name is now just as widely-recognized as the big group and he stayed true to the letter of medical ethics. What my friend did was meet another friend; a chap named Watson.

Not A Young Fellow

Watson is certainly not a newborn. The product was introduced by Natural Microsystems (6 Mercer Road, Natick, MA 01760; 800-6-WATSON) way back in 1984. Since then, the Watson modem and voice mail technology has been extensively reviewed and well-received by the industry as well as the consumers. It has been reviewed right here in the pages of *Computer Shopper* as well. I won't reply all those glowing reviews here.

What we will discuss is the unique "Voice Information System" or "VIS" software that turns the Watson Voice Mail system into an intelligent, caller-controlled voice information system. With a "bare bones" Watson system (which consists of a full-length 300/1200 baud Hayes compatible modem card and software for dialing or answering and delivering a selected message), you have an intelligent answering machine. With the VIS option you have an interactive voice system, capable of asking questions and delivering answers based on the responses of the caller.

With these capabilities in mind, we decided to implement in Arkansas a complete health library system to provide consumer health information accessible by a 1-800 from anywhere in the state of Arkansas. We envisioned a caller dialing in and selecting from an extensive menu and then listening to a 2-3 minute voice recording full of reliable, authoritative health information. Then, after hearing the information, the caller could leave a message requesting more information or make suggestions on additional topics for the Health Voice Library. With Watson and VIS, it's a snap.

Plugging In

The VIS option for Watson comes on two diskettes and a PROM chip. You remove a chip from the Watson board (the extractor/insertor tool is provided) and plug the new PROM in. Then install the software on your hard disk drive. To develop any kind of information delivery system, you need to use Watson VIS with a hard disk drive, 20 megabytes or larger. Since the messages that will be delivered are digitized and stored on disk space, you have to have adequate storage capacity to use the VIS effectively. Try to chose a hard drive with a relatively fast access time as well. Slow hard drive times will make the switching between messages seem a little "jerky." But even with slow drives, it is only a minor point and most listeners probably won't notice.

Once set up, you start Watson and configure the initial settings. By pressing ALT-F6, you can tell Watson to answer after how many rings, and (when dialing out) to hangup if no answer after X rings, etc. You can also configure the data compression to be used for the system for each card file. What does that mean? Since the VIS system stores all voice information on your hard drive, for a complex system disk space it is at a premium. You can get about

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EasyFlow

Interactive Flow Charting Program For The PC

Reviewed by Lon Andrews

Flow charting can be a tremendous asset in planning or tracking but it can also be major pain in the neck to accomplish. I have always had problems with producing a livable final product—there is usually one line or one box out of place or in a position that looks unbalanced. Setting up a large flow chart is a time consuming chore to say the least so I have left this task to my more artistic co-workers.

EasyFlow has changed this for me. Flow charts are easier than falling off the proverbial log and they look good! HavenTree Software Limited's EasyFlow turns out professional looking flow charts and organizational charts with a minimum of effort provided you have a half-way decent printer hooked up to your computer. This is not a program that allows you to draw symbols and enter text. It is a program that allows you to call up the needed designs and add the text that completes the chart. Lines are routed automatically by EasyFlow. This in itself relieves the user of a time consuming chore.

Your computer must have graphics capability in order to use EasyFlow. CGA, EGA, VGA and the Hercules Monochrome Video adapter will support this program. The Hercules adapter will work only connected to a monochrome display. The plain IBM Monochrome Adapter will not support EasyFlow. Your computer must have at least 384K and DOS 2.x or better.

HavenTree has adopted a refreshing approach to documenting Easy Flow. The first indication of this attitude is the "Bloodthirsty License Agreement" that informs you to keep your doors locked if you are a pirate. Seems as if HavenTree has an attack shark on board to handle such problems. They also advise you not to lose the program manual. All requests for replacement manuals are forwarded to the Lost manual Review Committee which meets once a month. They don't send out many replacement manuals but they do have a good time laughing at a lot of the requests... "the dog chewed it up"... and so on. If you want to by pass the committee just send in $149.75. (EasyFlow costs $149.95).

EasyFlow is not copy protected and installs without fuss. Since HavenTree has been thoughtful enough to resist copy protecting this program please return the favor by not passing the program around. To install on a hard disk simply create a directory and copy the files from the floppy. A floppy working disk is created by using DISKCOPY. The files will take up most of the floppy so you will need a data disk to use for storing your charts. Use the program disk in drive A and the data disk in drive B. EasyFlow supports mouse operation with pull down menus but will function just as easy with the keyboard.

Incorporated into the program is an excellent HELP function to get you over the humps and pits. If you don't have a few minutes to spend with the manual to get started the authors recommend a product called "HARDFLOW" which is simply a template and a pencil in order to draw your flow charts. A few minutes spent in the manual will save you a lot of time as you progress through EasyFlow.

Run the program by typing EASYFLOW and you will find yourself at the main menu with five options,

Work On A Chart,
Printer Configure,
File Manager,
Utilities, and
Exit to DOS.

At the same time a window will show you what printer you have in the configuration and the port to which the data is routed. EasyFlow comes configured for the IBM Graphics Printer but you can change the configuration through the main menu with little or no trouble. The documentation devotes several pages to printers and configurations. This is especially well written for the computer operator that might not be well versed in printer variations. One of the things the author(s) of the documentation are to be commended for is telling you up front how to get out of the program once you have started it. I don't know about you but I have been stuck more than once in a new program and couldn't figure out how to exit the #### thing! Some manuals bury this little tidbit under some vague title in the back of a three hundred page manual.

EasyFlow does not have to be configured for a mouse, just go ahead and use one if you desire. Each command can be accessed by Mouse, by using the arrows and ENTER, by using the keyboard letter that is the same as the first letter of the menu option or in some cases by using one of the function keys.

The main menu option, File Manager provides the opportunity to view the directory, kill off old files and

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Intel Inboard 386/PC

by Tom Garcia

Overview

You say your old PC or XT isn't fast enough any more? Wish you had more memory, beyond 640K? Thinking ahead to OS/2 and 80386 power? Stay tuned—Intel has a solution for you. It's their Inboard 386/PC add-on board which will get you up and running in the big leagues for less than a thousand dollars, maybe quite a bit less if you shop carefully in the pages of *Computer Shopper*. All you need (besides the board) is a base model PC or XT or close compatible clone.

The Inboard 386/PC is a full length board that fits into a standard eight bit PC slot. It has an 80386 processor on board, plus one megabyte of fast, 32 bit memory, and various associated support circuitry and chips. There is a five year limited warranty from Intel on this product.

Your old 8088 (or V-20 processor will be completely off-line after installation of the Inboard 386/PC, in fact, it won't even be in its socket on the motherboard anymore. Any 8087 math coprocessor that you might have had must come out too, but there is an 80387 coprocessor socket on the new board. All of your existing expansion boards should continue to work. One of the few disadvantages of this kind of an upgrade is that you will not ever be able to use AT style 16 bit add-on boards.

What kind of speed do you get with the Inboard 386/PC installed? It's like the difference between walking and flying! My old XT clone was running at 4.77MHz. A PC that I use at work has a "turbo" mode boosting its clock speed to 8MHz as I switched back and forth between the two speeds.

As soon as the Inboard 386/PC was up and running in the XT I was immediately aware of the change of pace in computing operations. It was like having a real speed demon under my fingertips. PC Tools Deluxe gave me a relative speed index of 725%. This is as compared to the original PC = 100%. Norton's Advanced System Information computing index, relative to the IBM/XT, read out at 16.5 which is a nice figure to contemplate.

The boards speed is due to four things: A clock running at 16MHz, the inherent swiftness of the 80386 CPU, the megabyte of fast memory and finally—0 [zero] wait-state operation of the whole shebang. For good measure, the system BIOS is remapped into 128K of fast RAM. In some cases an EGA ROM BIOS can also be remapped into fast RAM.

Just in case you ever get nostalgic for the old 4.77MHz you can throttle the Inboard 386/PC down (from the keyboard) to 30 wait states plus several other in between speeds. It's possible that some software might require slower speeds (games?) but I haven't encountered any in my several months experience with the Inboard 386/PC.

Installation

Intel provides a 136 page indexed manual with specific installation instructions for the computers the Inboard 386/PC is designed to work with. Individual chapters cover the IBM PC and XT, the Tandy 1200 HD series, and the Compaq Portable and Portable Plus. Obviously, a lot of clones can use the board as so many of them adhere closely to the standard set by IBM. Don't try to use the Inboard 386/PC with an IBM XT/286 or with a computer using an 8086 CPU.

In general, here is what to do to install the board: Turn off the computer and pull the power cord. Take off the case or cover of the machine so that the motherboard and slots are in view. Remove any boards in slots five through eight. This is so you will have some room to work.

Disable motherboard memory above 256K via the appropriate DIP switch. Clear instructions and drawings in the manual explain this procedure. If you have a multifunction board providing additional conventional memory and you want to keep it for its clock, ports, etc., set its memory configuration for 0 [zero]. Or, plan on leaving it out of the computer. If you have an Intel Above Board memory board make sure that all of its memory is allocated as expanded memory.

Next, pull the 8088 and 8087 chips (you may not have an 8087). A tool is provided to assist in this and it does work like a charm. Another DIP switch may have to be reset and the manual could be a little clearer on this point. Here is how it works. If you had an 8087 math coprocessor on the PC motherboard chip and you have an 80387 coprocessor on the Inboard 386/PC you don't have to change the switch. In a like manner, if you didn't

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Inside Concurrent DOS 386—Part 8

by Peter Ruber

Before I begin this month's Concurrent DOS 386 column, I should like to mention that it will be on hiatus during July and August. In its place will be a special series of interviews I conducted with Digital Research's Founder and chairman, Gary Kildall, and members of the new management. Included will be a review of a major new product that DRI will be announcing on June 21st, the same date the July issue of *Computer Shopper* goes into distribution. It is certain to spark some controversy and cheering within the industry.

I'm going to change directions with this article by describing how Concurrent DOS 386 is being implemented as a multi-user graphics workstation system with multi-tasking on all virtual consoles. The first of these customized versions is SMARTSCREEN from Concurrent Controls, Inc., Digital Research OEM. While this initial offering only supports monochrome graphics, multi-user color graphics are on the way, and are expected to be released around July 1987. I have also included capsule reviews of four utility programs from Logan industries that will expand the versatility of multi-user Concurrent DOS system. While these products deserve more space than I have given them, I don't expect to have space available in this series for some months to come, and I felt that a brief review now would serve readers better than if I delayed mentioning them.

When this column resumes in September, I will explore several multi-user color graphics systems that are currently in development by Digital Research and its OEMs. One of these will be making use of new state of the art fiber-optic hardware technology from Sun River which I have been waiting to work with for nearly a year. DRI will unveil this system at the Atlanta COMDEX in May. There will be other multi-user graphics solutions available within this time-frame.

Intel's 80386 microprocessor is capable of performing tasks that have yet to be tapped by operating system designers. This power is beginning to encroach upon the turf established by such workstation leaders as Sun, Apollo, Hewlett-Packard, and others. These engineering workstations are built around high-powered Motorola 32-bit processors and custom RISC processors. Their rapid graphics displays are often supported by VAX mini-computers sporting great gobs of memory and high capacity disk drives.

There are also systems designed around the Multibus II which can support "true" multi-processor operations in a way that IBM's Micro Channel Architecture can't at this stage of its engineering development. When multiple processors are used simultaneously on a Multibus II system, the host CPU doesn't have to share its resources with the attached processors. In the MCA, bus signals haven't been defined yet to

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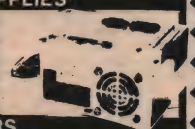

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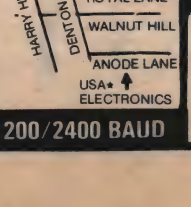

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Seagate 251-0	40mB 39msec hh	$409.00	$459.00
Seagate 251-1	40mB 28msec hh	$469.00	$519.00
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*XT kits include cables, rails, software (over 32 mB), controller, and instructions.
*AT kits include cables, rails, software (over 32 mB), and instructions.

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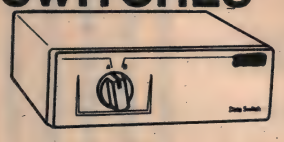

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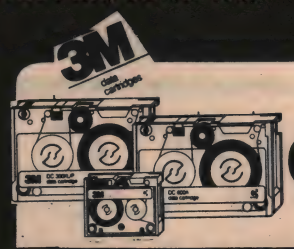

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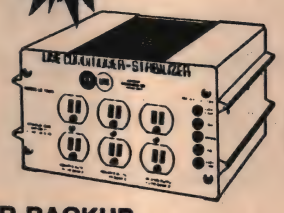

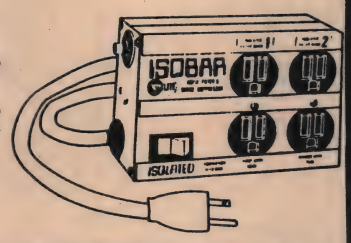

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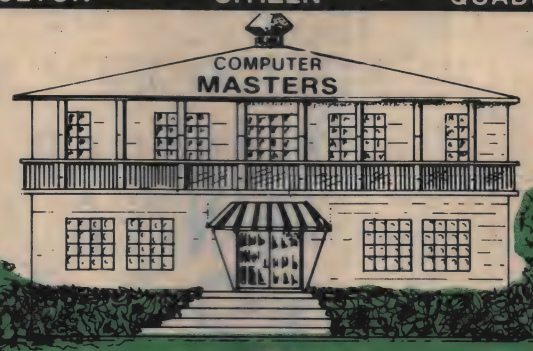

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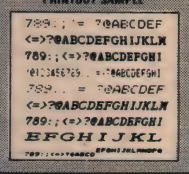

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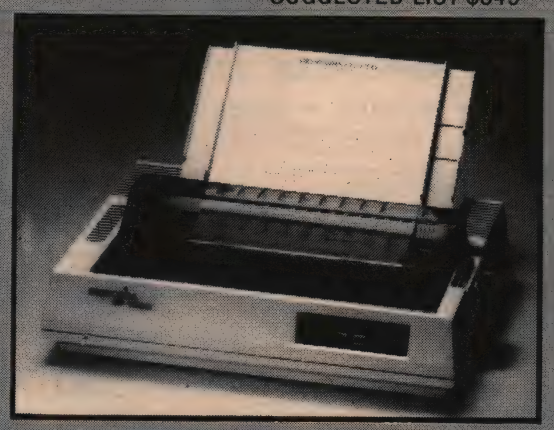

Emulates Image Writer I

			Character Structure (H x V + Space)	Maximum Column Number	Character Spacing (Character/Inch)	Print Speed (Character/Second)
Standard Character	Standard	Pica	*12x9	80	10	100
		Elite	*12x9	96	12	50
		Condensed	*14x9	137	17	70
	Near Letter Quality	Pica	*24x18	80	10	20
		Elite	*12x18	96	12	24
Italic Cursive Character	Standard	Pica	*16x9	80	10	100
		Elite	*16x9	96	12	50
		Condensed	*18x9	137	17	70
	Near Letter Quality	Pica	*32x18	80	10	20
		Elite	*32x18	96	12	24
Graphic	Single Density Graphic		nx8	480 dot column	—	600 dot column
	Double Density Graphic +		nx8	960 dot column	—	490 dot column
	Double Speed, Double Density Graphic		nx8	*960 dot column	—	600 dot column
	Quadruple Density Graphic +		nx8	*1920 dot column	—	*980 dot column
	640 Dot Graphic		nx8	640 dot column	—	326 dot column
	576 Dot Graphic		nx8	576 dot column	—	294 dot column
	720 Dot Graphic		nx8	720 dot column	—	367 dot column

* Indicates that the specified figure includes half dots +Not available on Commodore Model

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APPLE

CADApple 3.5

Reviewed by Philip Chien

CADApple was introduced in 1982 for the Apple II by T&W Systems, a relatively small CAD (Computer Aided Design) software company. Since then T&W has produced one of the most popular CAD packages, VersaCAD, and the company has been renamed VersaCAD Corporation. The full powered VersaCAD program is only available for MSDOS and Macintosh computers at the present, however CADApple has gone through severa' upgrades and enhancements and th latest version, CADApple 3.5, include support for the Apple IIgs including the SuperHIRES modes.

CADApple supports a variety of differnt input devices and plotters for output. The minimum Apple required is a 128K Apple IIe, IIc, or IIgs with at least two disk drives, preferably 3.5" drives or a hard drive. Regrettably large memory boards are only supported as RAMdisks, not as expanded storage. Since the program is written in Apple Pascal 1.3, any memory board, hard drive, or other hardware device has to support Apple Pascal. Standard accelerator boards are supported, and there are co-processor cards designed specifically to speed up Apple Pascal which work with CADApple. The combination of an accelerator and coprocessor board along with a properly setup RAMdisk will produce an extremely fast, powerful CAD system. The Apple Mouse, Joystick, and a variety of digitizer tablets can be used for input of coordinates for line segments, however all menu items have to be selected from the keyboard. Output is primarily plotter oriented, and CADApple supports HP, Houston Instruments, Roland, Ioline, and the Apple Color plotter. Regrettably graphics printers aren't well supported. The only printer support available is a dump screen command, and that command only works if you have a Grappler compatible interface card. The only dot matrix graphics support from CADApple is that it will send the graphics control codes to your printer, which will then print the entire Apple screen including the text prompts. Even if you have an Apple IIgs you'll need a serial interface card with graphics capability to dump graphics to your ImageWriter. You can't dump a large picture which doesn't fit into the screen window from CADApple unless you use a plotter. Dot matrix users will find output from CADApple rather limited since the program is heavily object, and therefore plotter oriented.

Since CADApple is an object oriented graphics system it stores your objects, shapes, and lines on your disk drive while the program is running. You can store up to 1000 objects on a 5.25" disk system or 4000 objects with a high density drive (Unidisk, hard disk, etc.). The 4000 object limit is a built in limitation of CADApple, however it shouldn't cause any problems unless you have extremely large or complicated images. Until the IIgs came out CADApple only supported the Apple single HIRES (280x192) graphics mode. On the IIgs the program also supports double HIRES monochrome (560x191). SuperHIRES 640x200 3 colors (plus background), and 320x200 15 color modes. The extended graphics modes are only available on a IIgs though. The IIe and IIc are still limited to single HIRES graphics. Naturally a graphics image can be much larger than your computer's screen, and you can scroll or zoom to select the portion of your image which you want to examine or edit. A special dual screen mode is available only if you have an enhanced Apple IIe with a Videx Videoterm or Ultraterm card. Normally CADApple toggles back and forth between text menus and the graphics screen. With a Videx 80 column card and an extra monitor you can have the monitor attached to your Videx card display the text menus constantly, and have the monitor attached to your Apple displaying the graphics at the same time. The dual monitor mode is quite useful when you are first learning all of the commands in CADApple, however less useful once you get the hang of how everything works.

So much for compatible hardware, and all of the permutations on how to get CADApple to work. Configuring the software can be almost as complicated as setting up your hardware and hooking up all of your cables. The program comes on four copyable 5.25" diskettes and a 3.5" diskette is also included in the package with all of the files on the same disk. Since the program is written under the Apple Pascal 1.3 operating system you'll have to understand and use Pascal's conventions. For example, instead of referring to your disk drives as drive 1 and drive 2, they're known as #4: and #5:. These "features" of how Pascal works are all outlined in the CADApple manual's appendix, and the tutorial shows you the best way to set up your diskettes. Naturally if you have a 3.5" drive

continued on page 339

Ask The Guru

by Don Lancaster

The FCC has dropped their plan for their proposed $6 per hour hacker telecomm tax, thanks in no small part to the cage rattling of all you *Computer Shopper* readers.

And, the foes of computer backup DAT digital audio tape have been dealt two severe blows. NBS first laughed them clear out of Congress when they showed that their insane hardware protection scheme just plain does not work, destroys program integrity, and is trivially easy to bypass.

Meanwhile, DAT champion Sony put their money where their mouth was and bought CBS records outright. In the process, they told all the anti-DATs at CBS to sit down and shut up.

Naturally, the anti-DATs have vowed to continue cutting off their nose to spite their face. After all, look at how the VCR completely stopped the entire movie industry dead in its tracks.

Apple IIgs sales have been going through the roof and breaking all sorts of records. Apple has responded to this deplorable and despicable situation in the predictable manner—by slashing the price of the Mac so it lists less than that of a loaded IIgs system.

Recently, a secret survey revealed that Apple had erred by a factor of four on their estimate of the average age of a IIgs buyer. Their planned "free skateboard with each IIgs purchased" promo has been cancelled.

Unfortunately, the thinking behind it does still remain in place. Bubble gum cards, anyone?

Actually, you might expect across-the-board price cuts this summer on the IIgs and most everything Apple.

The Apple "suggested list prices" are totally meaningless anyway so long as you do shop around for a reasonable dealer. You will get the worst prices from the larger yuppie chains such as Computerland or Businessland, or from a dealer that has a "lock" on a regional market. The trick is to ask around at your local user group to find out who the good guys and the bad guys are in your particular area.

You can get a list of all your local Apple user groups by calling (800) 538-9696, Extension 500.

If you are at all involved with any sort of a school, be sure to check into some of the Apple's great educational discounts. There's also a very lively used Apple market. I have been particularly impressed with the many offerings from Shreve Systems.

Let's see. I just got word on a low cost replacement for the Kroy Kolor machine that is based on the widely discounted Canon fuser unit. More details on this next month.

Adobe Systems has finally released the "green book." This is volume three in their PostScript programming series. Yes, I have copies on hand here if you cannot find them locally. This one is on PostScript program design and has lots of hands-on detailed examples in it.

And, yes, my new LaserWriter NTX finally showed up. But not in time for a thorough test and review this month.

Some quick answers:

Yes, this is an absolutely outstanding machine that should define what laser printing should and will be for the next several years.

Yes, each of those predicted major problems we looked at last month exist and are for real.

Yes,there is at least a 2:1 speedup, provided you do not let AppleTalk or your application program get in the way. In some cases, the speedup can and will end up negligible.

Yes, the NTX works beautifully with the IBM clones, and every other host computer under the sun. Various handshaking options are now both switch and software selectable.

No, the AppleTalk network is most definitely not needed to use this great machine. In fact, it often will slow you down and might severely limit your choice of your host computer, besides costing you extra money.

A reminder that yours truly and a bunch of other Apple incendiaries—uh, better make that luminaries—will be talking and seminaring and showing and telling at the stupendous AzApple Fiesta at the Safari Hotel in Scottsdale Arizona, on June 11th and 12th. For more details, you might contact Jerry Cline at AzApple (602) 264-3800.

It seems that the great PostScript BBS over at (409)244-4704 have been including a free IQ test in their logon process, and that more than a few readers of a certain Florida-based computer magazine have been failing the test, So, I'll give you a hint. The obscure, sneaky,

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C' Prime From Manx Software Systems

Reviewed by Joe Schell

C' Prime is a package available from Manx Software Systems (One Industrial Way, Eatontown, NJ 07724). It is a full Kernighan/Richie implementation except for bit fields. The price is $75. Although it is available for a number of different machines this review is about the Apple version.

To run this on an Apple (II, IIe or enhanced IIe) you need one disk drive and DOS 3.3, which is hardly a requirement as there are very few systems that don't have both. It modifies DOS when it runs, so some DOSs other than the Apple version might not work. However, I use it on a Sider Hard Disk which uses a slightly modified DOS and I have had no problems. I would suppose that anything that has the same RWTS and File Manager entry points will work.

The Programs

My version arrived with four disks. The disks are not differentiated from each other and they included programs with the same names with obviously different purposes. For instance one of the programs seems to be for running Apprentice C which Manx sells as an introduction for C, but it has the same name as the C' Prime compiler.

However, it doesn't take too long to find the most important programs which are shell, c65, as65, ln, ved, config, libutil, sh65.lib, flt65.lib and g.lib. The last three are all libraries, used by ln and can be modified by libutil. And config is used to setup C to handle the differences between the various Apples.

The shell is perhaps the most unexpected surprise in the package. I expected C, but shell gives me an environment that I would normally expect to only find on larger machines. Among some of the commands are the following: cp (copy a file), mv (move a file), rm (delete a file), ls (for a catalog of files). It also makes it possible for programs to be executed as commands with arguments. So, instead of typing "run example" I would just type "example." And I can also add arguments such as "example file1 file2" where file1 and file2 are arguments on the command line.

And commands aren't limited solely to programs. It will also use EXEC files. I have one EXEC file named cc which compiles and then links a program, thus saving me quite a bit of typing. It also supplies a loop structure and variables for EXEC files so it can handle arguments that the EXEC file might have on the command line.

Unfortunately, EXEC files cannot be nested. Nor can they handle suffixes (.c, .asm, etc) in an intelligent way. Also unfortunately, the normal shell command such as cp cannot be renamed. A common procedure in most C environments is to redefine rm (delete a file) so that it moves the file to a trash directory. That way a deleted file can be recovered if needed. However, the only way to do that in the shell is to use another name as the delete command.

The next program is c65 which is the compiler. It works as promised. And being careful about what library routines are used it is possible to write routines which do not need the shell to run (stand-alone).

However, it is still possible to blow it up. And there really isn't anyway to tell if it has blown up. Considering that the Apple is such a slow machine (I am already commonly working on programs which take 10 minutes to compile off of a hard disk) it certainly would have been nice if there was some feedback from the compiler. For instance it could print periods as it looked at each line or it could print an address or number. Others should also remember that I have done all my work from a hard disk. Since c65, as65, and ln are all necessary to run a program and all work from a disk, using regular disk drives could be very slow.

The assembler, as65, is very useful. Considering the variety of machine language routines available on the Apple it is almost essential that a programmer be able to access them. The assembler provides that flexibility. Perhaps the only thing it is missing is the ability to use macros.

The ln is essential for any C package. It allows the user to attach different libraries to programs. Since C' Prime also comes with libutil which allows the user to make libraries, almost anything can be done. For instance, one of my current projects is a library which will allow a C program to run under ProDOS even though it runs under DOS now. That is flexibility. About the only

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Ask The Guru
continued from page 191

and arcane super-secret access password is—NEW.

And it looks like its time to try and keep Canis Lupus away from the door again. So, the usual reminder that we have bound sets of my Ask the Guru reprints available, along with my Introduction to PostScript video and my new PostScript Show and Tell, now available for most computers.

Also some new PostScript language packages on printed circuit layout and two point perspective drawing. Write or call if you are interested.

Let's start with a summer rerun.

How Can I Use The Old 20 Pin Drives On A IIgs?

We've had a lot of calls on this recently, so let's do a rerun. Figure 1 shows you how to build a dual "old drive" adaptor that lets you daisy chain the original 20-pin 5¼ inch Apple drives onto the IIgs 3½ drive 19 pin output connectors.

Note particularly that pin 4 must be grounded, and a pullup resistor is recommended as shown. Also be very careful to use shrouded or otherwise restrained connectors. If you wrongly plug a 5¼ drive in so it is offset by one pin or by one pin row, you can instantly destroy several drives and the IIgs motherboard.

Note also that, yes, you can freely plug printer cables in and out any time you like. But if you try connecting or disconnecting a disk drive on a IIgs with the power applied, you are almost certain to destroy either the drive or the IIgs motherboard.

Do NOT ever add or remove a drive when IIgs power is applied!

Remember finally that there is a "rundown" time on your IIgs power supply. Always wait a minimum of 40 seconds after turning the power off before changing any card or cable.

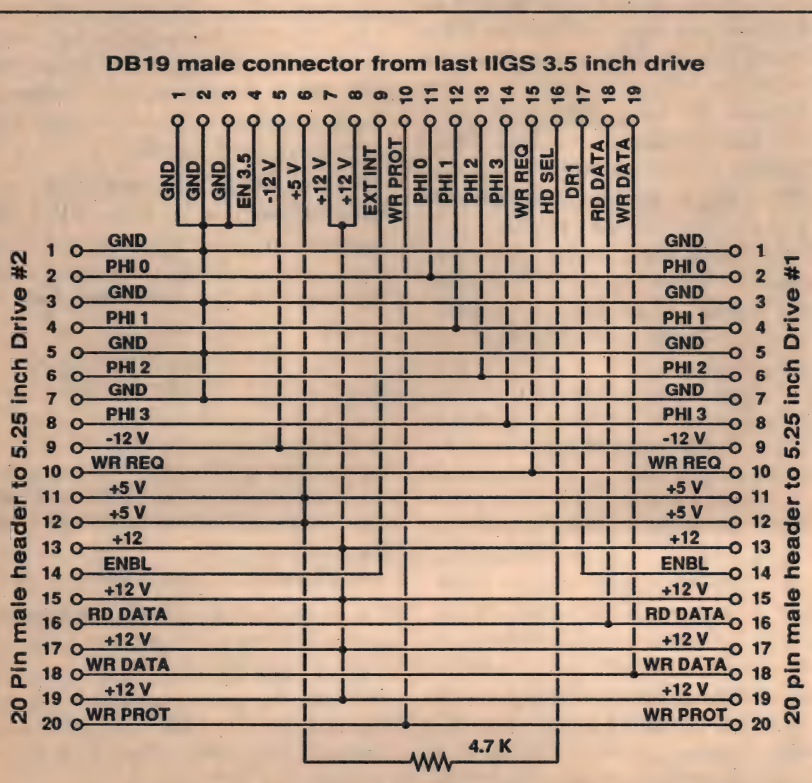


Fig. 1 – Apple IIgs old disk drive adaptor.

One commercial source of these adaptors is Redmond Cable.

Show Me A List Of The Main IIgs Tools

One of the best ways to learn to use the tools in the IIgs toolkit is to tear apart the working code of others to see just how it is done.

A toolbox call is made by shoving things onto the stack, loading the X register with a two hex digit high value for the tool and a two hex digit low value for the toolset. A JSL $E10000 is then done to activate the tool. The tool, in turn does its thing, makes some changes, and leaves some pointers and results back on the stack.

I have never found a really good "backwards" list of all the IIgs tools arranged in numeric order by call, so Figure 2 (page 343) gives you a more or less complete list.

More details on each individual tool appear in the *IIgs Toolbox Reference Manuals*, volumes I and II, available through the APDA people. And for a super-secret, ultra fast, and extremely simple method of tearing apart most any machine language program, check into my *Enhancing Your Apple IIe*, volume I.

Which Laser Printer Should I Buy?

That is a very good question that comes up at least a dozen times a day on the helpline.

Here are what the helpline callers seem to be thinking at present. First and foremeost, genuine Adobe PostScript is an absolute must, since there is at least a 50:1 performance advantage over all the imitators and hanger-ons.

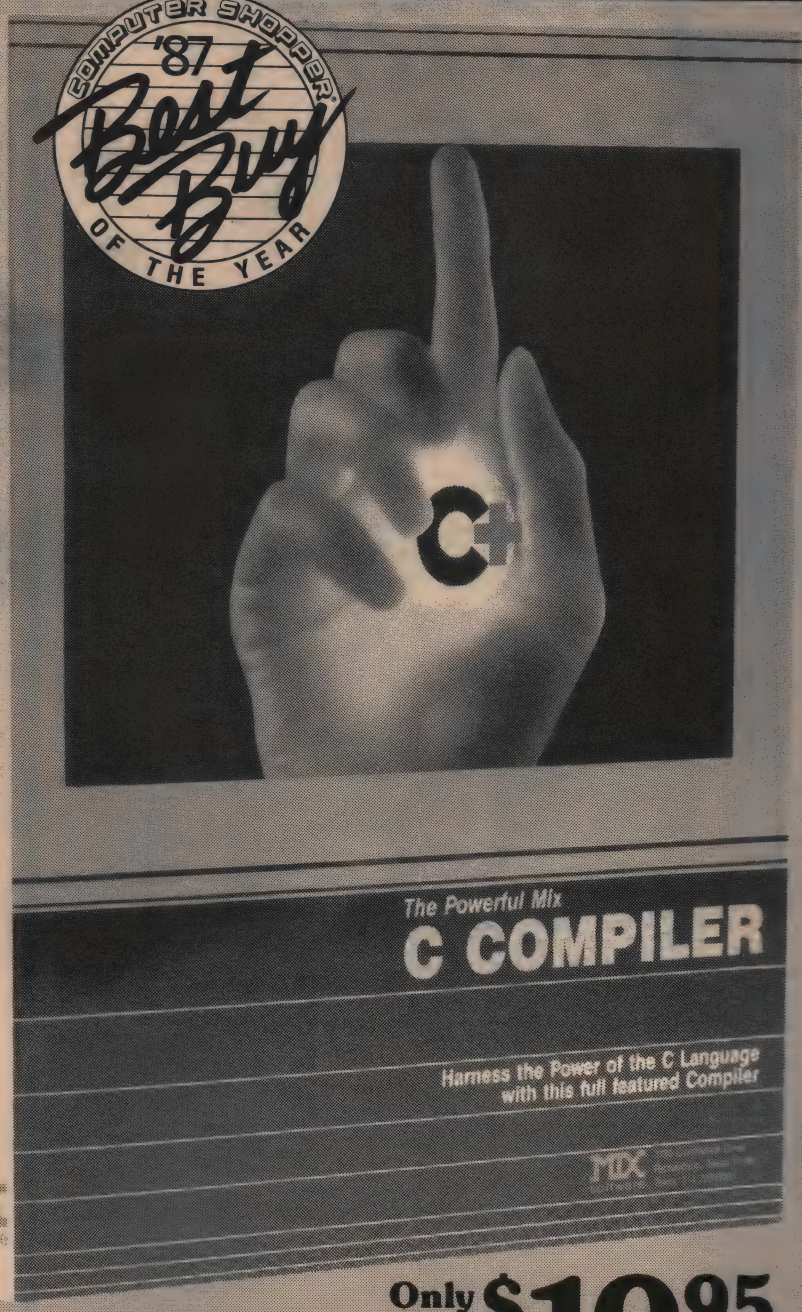
Secondly, you might want to avoid the Riccoh engine, since helpline callers report serious problems imaging small text, cite the slow speed, note the lack of a manual feed, and complain about the long term print reliability.

It seems to me that this leaves you with five reasonably viable options today:

(1) The Laserwriter NT or the NTX, which should be the "center of the universe" of PostScript laser printing for the next several years.

continued on page 339

C COMPILER



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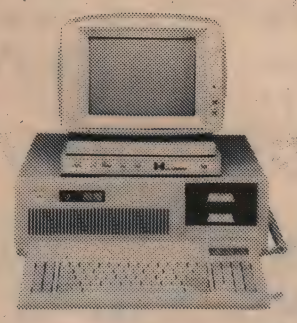

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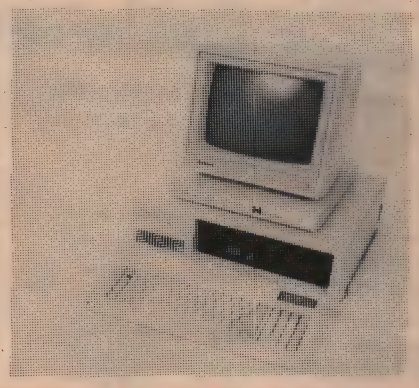

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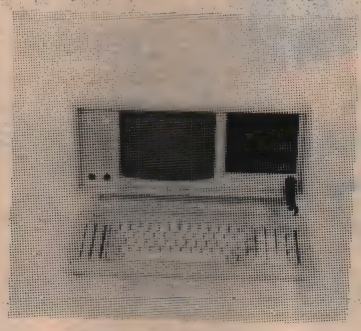

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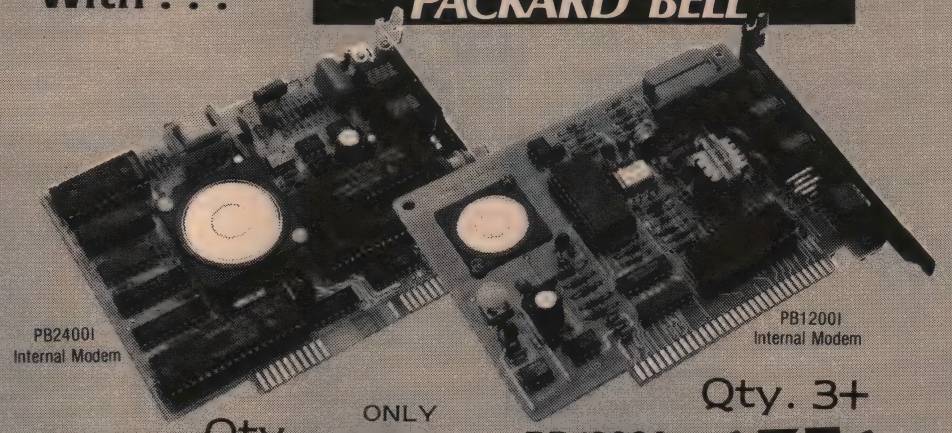

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MACINTOSH

Intellectual Property, Probity And Propriety

by Max Stax

Dear Chuckie:

Sometimes I really wonder. People say they want reality, not philosophy. But like I've always said, it all really comes down to philosophy, anyhow. Like this Apple lawsuit business, Chuck. If it comes to a jury trial, we could have a bunch of everyday folks like you and me deliberating over an issue that's a real blue Plato special.

It's the free enterprise system that made this country, that's for darned sure. And one of the underpinnings of capitalism is property. Yep, this is mine, it belongs to me, you can't have it, that's what made us great. Now let's consider intellectual property. Descartes might have put it, "I thought of it, therefore it's mine."

Now this is all well and good. I believe that inventors should be able to protect their ideas from rip-off by the unscrupulous. I believe that trademarks and copyrights have their place in a free society.

But this look and feel thing, well I'm not so sure about that. Should Apple cast the first stones? And I'm not talking Xerox, now. I'm talking personal look-and-feel. I mean, Gary Hart might well bring suit against John Sculley (enlightened "new ideas" techno-WASP tweedy dog-owner look with honest watery eye-contact Docksider-preppie soft-spoken voice-of-vision feel). Jean-Paul Belmondo might enjoin against Jean-Louis Gassee (short but virile brilliant-sexy jutting-lip Frenchman look with hyphenated-Jean-first-name rebel-with-a-cause slap-her-face-but-still-sensitive frank-Franc feel). Michael J. Fox could sue Chris Espinoza (sharp young blow-dried short-but-physical good guy look with precocious man-boy voice-cracking wise-cracking friend of mad scientists feel). Why even the great Woz himself could be successfully litigated against by pocket-protected millionaire geniuses with bad beards everywhere.

And I don't have to tell you what would happen at Apple if all of its tippy-top management had to be replaced in one swoop by judicial decree. It would be pandemonium.

They could be courting disaster here, if you ask me.

But hey, we're supposed to be talking about HyperCard.

A good friend of mine is responsible for several good HyperCard ideas. Like any good stacker, he without hesitation shared his ideas with the world. And as he expected, whenever his ideas were good, they were immediately appropriated by others. In some cases, with rather minor improvements, the ideas were represented as the sole work of others, without acknowledgment to him. Didn't this upset him? Didn't this bother him? Didn't this make him want to drop-kick innocent furry animals?

"Not at all,"says he. "That's what makes it all worthwhile." Jimmy-crack-corn, and I don't care. Now what in heck kind of attitude is that?

"Imagine," says my friend by way of explanation, "it's a cold winter morning in Detroit, 1909. Henry Ford puts a call into the Dodge Brothers. Bill Dodge answers the phone."(Slow dissolve and flashback music)

HANK: Are you sitting, Billy?

BILL: Actually, I'm still in bed. It's twelve minutes until six.

HANK: Didn't know it was that late, heh heh. Listen Billy, I want you to go down to your plant today and tell 'em to stop screwing steering wheels into your cars.

BILL: That's a good one, Henry. Thanks for calling. Goodbye, now.

HANK: Don't hang up, Billy. This is no joke. I've obtained a patent on the steering wheel. Not only must you stop installing them in your new cars, you've got to rip them out of all the unshipped units in your storage facilities.

BILL: Henry, you know and I know that you steered your car with a tiller until you saw a steering wheel on the Daimler in 1901. You no more invented the steering wheel than you invented the automobile. You'd have people believing that one, too.

HANK: You're missing the point, Billy. The point is that I'm the one that undertook to protect the thing legally, and the government says okay. Your

continued on page 198

MacUniverse

by Barbara E. McMullen & John F. McMullen

Law Suit! Law Suit!—That's what everyone's talking about in the MacUniverse this month. Apple sues Microsoft and Hewlett-Packard over their repsective products, Microsoft Windows 2.03 and New Wave which Apple contends infringe on the Apple Desktop Interface. As advocates of a common user interface, we have been happy about the evolution of the "IBM & compatible" world toward a "Mac-like" interface and have felt that such development made Macintoshes more acceptable to that portion of the corporate world that had resisted the purchase of Macs. We also felt that Apple's recent addition of Multi-Finder and HyperCard (particularly HyperCard) would keep the Apple product far enough ahead of the DOS environment so that there would be little possibility of the other world swallowing the Mac. We saw the ease of connectivity through "DaynaFile" at the disk level and TOPS and the recently announced Novell Mac support at the network level to be further reasons to saturate an IBM & compatible installation with Macintoshes. After all, if it's all going to work the same, why not get the system that requires the least overhead and works the best—the Macintosh.

In short, we welcomed the similarity and never dreamed that Apple would try to halt the movement in that direction particularly since the provider of the vehicle for the movement was also the leading provider of Macintosh applications software—Microsoft. If we did ever consider (and I think we did) the possibility of such a suit, we were persuaded by the author of "Odyssey," one John Sculley, that such litigation was not in Apple's best interest and would therefore be avoided. "We had worked too hard to turn Apple around. We couldn't let our emotions get in the way of what was right for the company. Open warfare with Microsoft would destroy everything we had accomplished with our reorganization. If we sued our most important software supplier, our business customers would think we lost our "minds" (p. 344); "While who was right was legally debatable, we couldn't afford to sue the only company developing successful software for Macintosh at a still turbulent time. Bill Gates and I hammered out a compromise license agreement, which was satisfactory to Microsoft yet protected the integrity of our Macintosh technology for Apple, (p. 345).

It turns out that what we took to be strategy was, in fact, only tactics. Sculley was not saying as Steve Jobs said recently at the Software Publishers Association symposium "We believed that, after seeing the user-interface technology at Xerox in 1979, our mission was to get this out to the world. To do that, we tried to take all of the best ideas we could find—and I think we came up with a few ourselves—and combined them into what is now known as the Macintosh." He was really only telling us that was not the right time to hit Microsoft. All Apple's eggs were in Microsoft's basket. "Excel" was needed to do what Apple had hoped that Lotus' disappointing "Jazz" would do and open corporate doors to Macintoshes. Sculley knew well that a powerful spreadsheet was required for a strong Mac corporate presence "I was betting that desktop publishing would be the stalking horse to get us into corporations and that Microsoft's Excel would expand the use of the Macintosh to more general productivity uses" (p. 345); "We also agreed to do co-marketing together to support Microsoft's Excel program, which had begun to gather rave reviews

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Apple's Macintosh II Chosen For TI's New AI Computer System

Apple Computer, Inc. and Texas Instruments recently announced the April availability of the microExplorer computer system, an Apple Macintosh II computer equipped with Texas Instruments' Explorer Lisp coprocessor board and advanced software environment. The system is a result of a value added reseller agreement between Apple and Texas Instruments. It provides advanced Artificial Intelligence (AI) developers and users the high performance, connectivity, and ease of use of the Macintosh II with the power of a special purpose Lisp workstation at low cost.

The new TI system adds to Apple's existing base of over 40 third-party developers and VARs for knowledge based and expert system applications providing a wide range of AI solutions to the Macintosh user.

"From Apple's viewpoint, the microExplorer expands Macintosh's current base of AI applications to a more sophisticated researcher or developer and opens a whole new level of applications to our users," says John Sculley, Apple's president and chief executive officer. "Users benefit from a single platform solution offering not only advanced AI capabilities but also access to more than 3,000 Macintosh general productivity applications," he said.

"The microExplorer represents a significant milestone in the integration of symbolic and conventional computing," says Jerry Junkins, TI's president and chief executive officer. "We believe that this kind of cost-effective delivery vehicle will facilitate the widespread deployment of expert systems and other AI applications."

The microExplorer AI board takes advantage of the Macintosh open architecture by inserting it into one of its six NuBus slots. The AI board brings the power of TI's Explorer Lisp chip, one of the most complex integrated circuits dedicated to AI, to the desktop. The microExplorer product furthers the development of advanced CASE and CAD/CAE tools for the Macintosh, and supports Apple's commitment to the engineering/scientific market.

This agreement with TI is one of Apple's largest value added reseller agreements to date for the Macintosh family of personal computers. Through this agreement customers will have the advantage of access to TI's service and support, as well as the experience of TI's established sales force. The VAR agreement reinforces Apple's emphasis on partnership with VARs and third parties to help Apple penetrate leading edge technologies, new markets and application areas.

For more information contact Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408-996-1010. ●

MacUniverse
continued from page 197

from the critics." (p. 346); as an aside, it's interesting that Sculley's "Odyssey," which through its presentation of Sculley's side of the "Throw Jobs From The Train" story, defused many of the snake-in-the-grass images of the author, may now give credence to an image of conniving opportunist.

We should have really picked up on Apple's passionately held belief that the Mac interface was either invented solely by Apple or handed to an Apple employee at Mt. Sinai on a stone table either just before or after (probably before) Moses got his instructions. In the last MacUniverse piece we mentioned, among other Mac references, Apple's 1987 publication, *Human Interface Guidelines: The Apple Desktop Interface* (Apple Computer/Addison-Wesley Publishing Company, Inc., $14.95). Even a cursory reading of this publication shows just how deeply Apple's vision of its proprietorship of the graphic interface is. While Appendix A gives proper mention of the development that had gone on at SRI and Xerox before Apple, the main text of the book has no room for any place but Cupertino (ex. "From its inception, Apple Computer has had a vision: to bring the power and versatility of computers to ordinary people. The Desktop Interface, introduced with the Lisa and further developed on the Macintosh, represents a quantum leap toward that goal." (from the forward). Additionally, the prose becomes so pompous that it seems that Apple has refined our tradition to, as we have stated in a sister publication, the *Judeo-Christian-Apple Tradition* (it's hard to miss the analogy when Apple puts forth the "ten fundamental principles of the Apple Desktop Interface" in a chapter called "Philosophy." Philosophy? Yes, Philosophy. Roll over, Aristotle, Aquinas, Decartes, Kant, Sarte. Here comes Sculley).

Are we right in criticizing Apple for this litigation? We don't think so—and the fact that Andy Hertzfeld, one of the patron saints of the MacUniverse, Dan Bricklin, co-creator of "VisiCalc," the product that popularized the personal computers in general and the Apple II in particular in corporate America, Doug Engelbart, Director of SRI's research center from 1963 to 1971 where the pioneer work in this type of interface was done and Steve Jobs have all been critical of the suit adds to our feeling. Additionally, we have had a discussion over the years with Microsoft founder and Chairman Bill Gates concerning "look & feel" and proprietary rights (the most recent—last July concerning the Lotus suit against Mosaic and Paperback Software for their alleged infringement on "1-2-3") and have found him to be extremely scrupulous about such infringement issues. We have doubt, therefore, that someone as bright and concerned about this issue would expose himself to such litigation.

Leaving Apple's motives and possible duplicity behind, is the litigation good for anyone—user, the industry or Apple, itself?? We think not. The user is, in our judgement, much better served if he or she can use one system of operation for all possible systems (this point is so obvious it's not worth dwelling on). The industry has given its answer by its criticism and the constant mention of software producers slowing down their development of "OS/2 Presentation Manager"—based applications. It must be said that, in spite of industry confusion and annoyance with Apple, many anti-IBM folks gloat that Apple has used an old IBM weapon—"FUD" (Fear, Uncertainty, Doubt) to slow IBM down (analysts generally see IBM rather than Microsoft or HP as the ultimate target of the suit even though it is not a named defendant).

The impact on Apple itself is less obvious. Some observers have actually praised Apple for protecting its stockholders through this litigation (yet the stock price has gone down). On the other hand, we hear that the suit has also caused some firms to slow their purchases of Macintoshes as the decision to open the firms to Macs was based, at least in part, by the understanding that the Mac was now a "safe purchase" since the DOS world would shortly have the same user interface—a reminder to Apple that, no matter how innovative the Mac, the corporate world still belongs to "IBM & compatibles." We felt, and still feel, that the coming together of the user interfaces clearly pointed to Apple as the industry leader in innovation and made it much more acceptable in the business world. We feel further, as stated in the beginning of this piece, that the Mac's price-performance, new features and products would keep it ahead of the competition. Therefore, we feel that, even where its own interests are concerned, Apple made a mistake.

If you care about this issue (no matter which point of view you have), write to Jean-Louis Gassee at Apple (Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014) or call him at, (408)996-1010—if he can't or won't talk to you, leave a message). If enough people take a position, Apple may listen! ●

Hyperspectives
continued from page 197

steering wheels are therefore in violation of my patent.

BILL: The government doesn't know what it's doing if it issued you a patent on the steering wheel. I'll fight you! I'll fight you!

HANK: Fine, Bill. But until such time as a decision is reached in my favor, and rest assured, it will be reached in my favor, you'll have to remove the steering wheel from the Dodge.

BILL: What do you expect me to give people to steer their cars with, Henry?

HANK: Let them use the command-line interface, Bill. (Click)

"Needless to say, this scenario is fictional," my friend continued. "But the point is that with some sorts of tools, human welfare has got to take precedence over intellectual property. No one would ever think of legislating the steering wheel out of a car, because it is painfully clear our lives are at stake when we're behind the wheel. Is it less significant to realize our minds are at stake when we're behind the keyboard? We need to share, and have free access to, the best ideas we can. HyperCard has helped us do so. I give many of my ideas away, and I know others like me. Some people think we're crazy, because we don't care too much for money, but hey, money can't buy me love. We think we're pretty cool, for exactly the same reason."

"It's ironic that Apple should introduce HyperCard right in front of its look-and-feel suit," he concludes. "Here we saw Paul buying drinks for everybody in the place, and now comes Peter, complaining that somebody's lifted his wallet."

I'll tell ya, Chuck. The wonders never cease.

Hyperware Utilities Volume 2

Here is a list of the second volume of great HyperCard utilities we've collected from various sources (all free for the connect time, we may add). Our compliments and respect to all those freeware and shareware programmers who have contributed their time and efforts to expand the realm of HyperCard, without sole thought to monetary recompense.

ANIMATION STACK, by David Brown. Automates the construction of click and drag animation sequences. Drop down the graphic you want to move, click and drag where you want it to move. The stack builds the animation script from there. A very helpful timesaver.

AUTO-SCRIPTER, by Gavin Young. Allows you to build stacks without typing scripts into Hypertalk. Build strings with prompted button-presses, then paste text into your own stacks.

CLASSICAL ICONS, by Gary Whitlock. Over 1400 icons in picture form. Indexed into 19 categories for easy access. Includes animals, logos, and utilities for use in your own stacks. An excellent resource.

CLIPBOARD XCMD, by John Pugh. An XCMD that can import and export text directly to and from the clipboard.

CURSOR STACK, by Ken Holyk. Over 50 different cursors you can use

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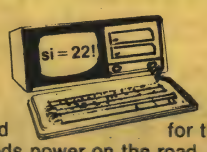

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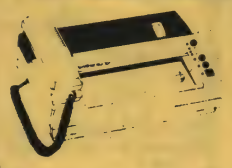

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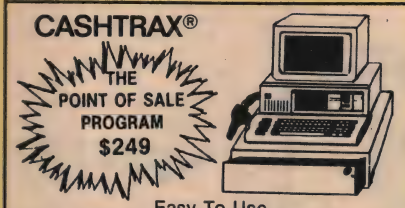

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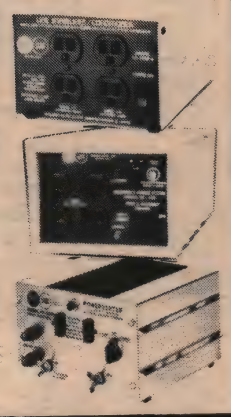

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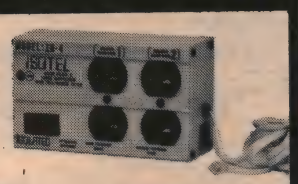

Total protection for modem/ telephone lines as well as full ISOBAR protection for AC lines. Isotel provides complete surge protection for computers, modems, FAX machines, telephones or any sensitive electronic equipment.

- RJ-11 input jack, output jack/cord
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- AC and modem protection in one unit.

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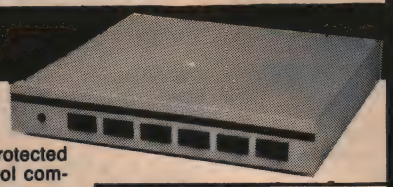

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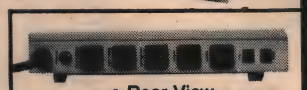
Features 5 surge protected outlets which control computer and peripherals, surge protected modem and telephone plugs, surge indicator and a noise filter for EMI-RFI.



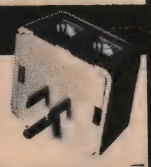
• Rear View

CUBE SURGE PROTECTOR

Small and convenient, these units offer good portable protection against surges.

CSP-1 **$4.95**

MODEM PROTECTOR



Protect your modem from spike and surge problems with this unit

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MSP-1

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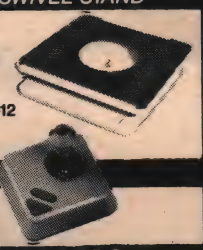

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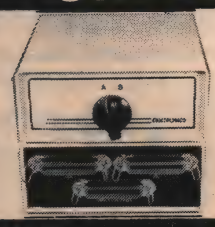
- Floppy Controller Card IFC-14 $34.95
- 576 K RamCard with O/K IFC-10 $49.95

SWITCHBOXES



All switchboxes come in heavy metal cases, are EMI-RFI protected and have rotary switch construction with gold plated contacts.

DB-25 LINE

Model #		
AB25-2	TWO POSITION	29.95
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AB36-4	FOUR POSITION	44.95
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AB36-X	CROSS OVER	49.95

DE-9 9 LINE

Model #		
AB09-2	TWO POSITION	29.95
AB09-4	FOUR POSITION	44.95

DA-15 15 LINE

Model #		
AB15-2	TWO POSITION	34.95
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Model #		
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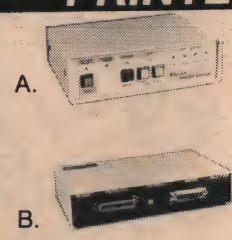
PRINTER BUFFERS



A.

B.

A. PB64 Parallel printer buffer . . $99.95
PB64 SB (As above with built-in switch box) $129.95
PB256 256K Parallel printer buffer $189.95
PB256 SB (As above with built-in switch box) $219.95

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MDV-Z $99.95

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Not shown. Includes: Convert-A-Pak, Three (3) Piece Kit converts METRO DATA-VAC II to "Roll-A-Round" vacuum. Includes: 3 Wheel Snap-On Dolly, 3' Flexible Extension Hose, Swivel Carpet/ Floor Tool.
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Not shown. Includes: Toner starter Kit (MDV-2 only). Includes Five (5) Special Toner Filter Disposable Bags. Two (2) Fiberglass Micro Filters, 3' Flexible Hose. Crevice Tool and Air "Pin-Pointer".
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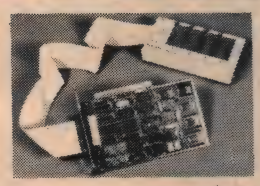
EPROM PROGRAMMER



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Programs up to 4, 16K thru 512K EPROMS.

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EPROM ERASER WITH TIMER

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Model #		
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25MM-10	10 ft.	9.95
25MM-25	25 ft.	19.95
25MM-50	50 ft.	37.95
25MM-100	100 ft.	69.95

DB-25 - LINE CABLES MALE-FEMALE

Model #		
25MF-6	6 ft.	7.95
25MF-10	10 ft.	9.95
25MF-25	25 ft.	19.95
25MF-50	50 ft.	37.95
25MF-100	100 ft.	69.95

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Model #		
36MM-6	6 ft.	8.95
36MM-10	10 ft.	10.95

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Model #		
9MM-6	6 ft.	7.95
9MM-10	10 ft.	9.95
9MM-25	25 ft.	14.95
9MM-50	50 ft.	22.45
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DFC-XTS	DUAL FLOPPY CABLE XT W/34S	6.95
DFC-XTE	DUAL FLOPPY CABLE XT W/34E	6.95
HDC-XT	HARD DRIVE CABLE SET XT	8.95
HDFC-AT	HARD & FLOPPY DRIVE CABLE SET AT	12.95
2HDC-22	DUAL HARD DRIVE CABLE SET	14.95
DFCEX-XT	EXT. FLOPPY CABLE 37P to 2, 34E	12.50
YAD-4	DRIVE POWER "Y" ADAPTER	3.50
TPA-4	TEAC 3 1/2" POWER ADAPTER	6.95

APPLE CABLE ASSEMBLIES

Model #		
AC-1	MAC512 TO IMAGE II	9.95
AC-2	IIe TO IMAGE II	9.95
AC-3	IIc TO IMAGE II	9.95
AC-4	MAC+ TO IMAGE II	9.95
AC-5	MAC+ TO 9 PIN MAC ADAPTER	9.95
AC-6	MAC+ TO HAYES MODEM	9.95
AC-7	8 PIN MINI DIN TO OPEN END	9.95
AC-8	MAC512 TO HAYES MODEM	9.95
AC-9	IIc TO HAYES MODEM	9.95
AC-10	IIe TO HAYES MODEM	9.95
SCSI-HD	MAC+ TO SCSI DISK	9.95
SCSI-DC	SCSI DAISY CHAIN CABLE	11.95
SCSI EC6	SCSI 6 FT. EXTENSION CABLE	15.95

IEEE-488 CABLES

Model #		
488-1	1 METER	39.95
488-2	2 METER	43.95
488-4	4 METER	49.95

POWER CABLES

Model #		
ACPC-02	PC POWER CORD	3.95
ACPC-03	PC POWER ADAPTER CABLE	4.95
ACPC-04	MONITOR POWER EXT. CABLE 6 FT.	5.50

POPULAR PC CABLE ASSEMBLIES

Model #		
KEC-6	KEYBOARD EXT. CABLE 6 FT.	3.95
MEC-6	MONITOR EXT. CABLE 6 FT.	5.95
9P-RCA	9 PIN MALE TO RCA PLUG 6 FT.	6.95
RGB-6	RGB CABLE, 9 MALE TO 8 PIN RECT.	6.95
VMC-10	VIDEO MONITOR CABLE, RCA TO RCA	2.50

CARD CABLE ASSEMBLIES

Model #		
CC001	GAME PORT CABLE 16S-15S	7.95
CC002	PARALLEL PORT CABLE 26S-25S	8.95
CC003	SERIAL PORT CABLE 26S-25P	8.95
CC004	SERIAL PORT CABLE 10S-9P	8.95

ADAPTERS & PROBLEM SOLVERS

Model #		
NMA-25	NULL MODEM ADAPTER -INLINE	5.95
NPB-25	MINI PATCH BOX SOLDER TYPE	9.95
MTT-25	MINI TESTER 7 LED's	9.95
AT-SCA	AT SERIAL CABLE ADAPTER	9.95
SPP-25	RS-232 DB-25 SURGE SUPPRESSOR	9.95
MSP-232	MODEM SURGE PROTECTOR	12.95
BRB-232	RS-232 BREAKOUT BOX	39.95
MWD-232	DB-25 WIRING DEVICE SOLDERLESS	14.95

COAXIAL CONNECTORS

58 = for RG58 59 = RG59 or RG 62

		1-24	25-29	50+
BNC MALE SOLDER TYPE				
9021	for RG-58	1.43	1.27	1.17
9020	for RG-59 or 62	1.43	1.27	1.17
9025	for RG-59 or 62 teflon	1.45	1.27	2.00
BNC MALE CRIMP TYPE - 3 PC.				
9101	for RG-58	1.33	1.18	1.08
9100	for RG-59 or 62	1.12	1.00	0.92
9103	for RG-59 or 62 teflon	1.33	1.18	1.08
BNC MALE CRIMP TYPE - 2 PC.				
9001	for RG-58	1.53	1.36	1.25
9000	for RG-59 or 62	1.53	1.36	1.25
9009	for RG-59 or 62 teflon	1.53	1.36	1.25
BNC FEMALE CRIMP TYPE - 2 PC.				
9014	for RG-58	1.63	1.45	1.33
9003	for RG-59 or 62	1.63	1.45	1.33
90015	for RG-59 or 62 teflon	1.63	1.45	1.33
BNC MALE TWIST ON TYPE				
9051	for RG-58	1.43	1.27	1.17
9050	for RG-59 or 62	1.33	1.18	1.08
9054	for RG-59 or 62 teflon	1.53	1.36	1.25
BNC FEMALE TWIST ON TYPE				
9031	for RG-58	2.45	2.18	2.00
9053	for RG-59 or 62	1.84	1.64	1.50
9033	for RG-59 or 62 teflon	2.45	2.18	2.00
BNC ADAPTERS				
7430	female splice	1.43	1.27	1.17
8130	male splice	2.24	2.00	1.83
8470	chassis mount feed thru	3.06	2.73	2.50
8460	bulkhead receptical	0.92	0.82	0.75
8150	right angle	3.67	3.27	3.00
BNC "T" TYPE CONNECTORS				
8140	2 female, 1 male	3.06	2.73	2.50
8141	all female	3.06	2.73	2.50
8142	all male	5.71	5.09	4.67
BNC TERMINATORS				
9008	50 ohm	2.45	2.18	2.00
9007	75 ohm	2.45	2.18	2.00
9093	93 ohm	2.45	2.18	2.00
BNC ADAPTERS MISC.				
7500	F female to BNC male	1.43	1.27	1.17
8100	BNC female to F male	1.84	1.64	1.50
7510	RCA female to BNC male	1.33	1.18	1.08
8110	BNC female to RCA male	1.84	1.64	1.50
8120	BNC female to UHF male	2.04	1.82	1.67
7420	UHF female to BNC male	2.04	1.82	1.67
TWINAX CONNECTORS				
9080	male	4.59	4.09	3.75
9081	female splice	4.59	4.09	3.75
9083	chassis mount feed thru	6.53	5.82	5.33
9085	T-connector all female	8.67	7.73	7.08
9086	100 ohm terminator	8.16	7.27	6.67

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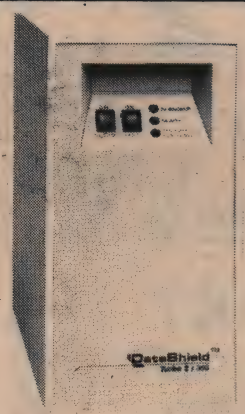
DATA SHIELD® TURBO-2 POWER PROTECTION



Model T2-300 shown - call for more information

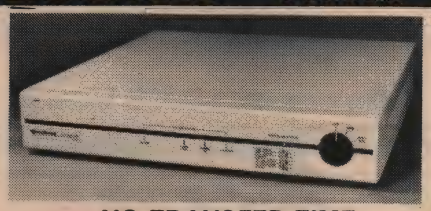
Power problems disappear with the addition of the second generation SPS DataShield Turbo 2 Series to your equipment. They are the most advanced in the DataShield Turbo backup power supply family--featuring a switchover time of under 1 ms, which makes them the best choice for protecting your valuable computer equipment and peripherals.

Model #	Output	Price
T2-300	300VA	$466
T2-450	450VA	$499
T2-625	625VA	$579

Other Datashield Models

Model #	Output	Price
AT500A	500 Watts	$599
AT800A	800 Watts	$699
AT1200A	1200 Watts	$1,099
AT1500A	1500 Watts	$1,399

DATASHIELD® SOLID STATE UPS SYSTEMS

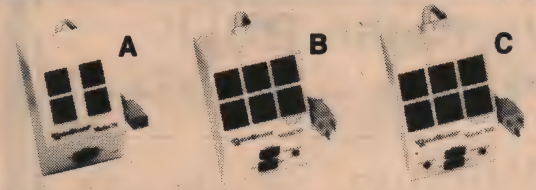


NO TRANSFER TIME

No transfer time, Compact size 3" high x 18" wide x 17" deep
The Ultimate in Power Protection

Model SS400 - 400 VA output, weight 32 lbs. $759.00
Model SS700 - 700 VA output, weight 39 lbs. $969.00

SUPER SURGE NOISE FILTERS



A. S75 - Surge protector, 4 socket — $45.00
B. S85 - Surge protector, filters, 6 socket — $59.00
C. S100 - Surge protector, filters, alarm, 6 socket — $69.00
Call for Information!

MODULAR PLUGS AND CABLE

Assemble your own specific lengths using these modular telephone plugs and wire.

Telephone Modular Plugs

Part #	Description	Ea.	100 Ea.
MP-4M	4 pin mini handset modular	0.25	14.95
MP-4	4 pin modular plug 4x6	0.25	14.95
MP-6	6 pin modular plug 6x6	0.25	15.95
MP-8	8 pin modular plug 8x8	0.35	26.95

Modular Cable

Part #	Desc.	Per ft.	100 ft.	1000 ft.
MW4	4 Cond.	0.10	6.95	49.95
MW6	6 Cond.	0.15	8.95	64.95
MW8	8 Cond.	0.20	12.95	99.95

CRIMPING TOOL

MCT-02 Crimps 4 or 6 pin modular plugs-also strips modular cable wire to proper length for crimping. $12.95
MCT-08 Crimps 8 pin modular plugs $24.95

MODULAR ADAPTER KITS

Use these modular adapter kits to change D-sub ports into modular jacks with either 6(RJ11) or 8(RJ45) pins. Simplifies installation of cabling used in networking and serial input/output devices. Available in 9, 15 and 25 pin D-sub male or female. Easy to assemble, just insert pins into connector where desired - comes complete with all hardware.

Model #	Description	1-49	50-99	100-UP
MA9M-6	9 MALE TO RJ-11	3.95	3.00	2.50
MA9F-6	9 FEMALE TO RJ-11	3.95	3.00	2.50
MA15M-6	15 MALE TO RJ-11	3.95	3.00	2.50
MA15F-6	15 FEMALE TO RJ-11	3.95	3.00	2.50
MA25M-6	25 MALE TO RJ-11	3.95	3.00	2.50
MA25F-6	25 FEMALE TO RJ-11	3.95	3.00	2.50
MA9M-8	9 MALE TO RJ-45	4.50	3.50	3.00
MA9F-8	9 FEMALE TO RJ-45	4.50	3.50	3.00
MA15M-8	15 MALE TO RJ-45	4.50	3.50	3.00
MA15F-8	15 FEMALE TO RJ-45	4.50	3.50	3.00
MA25M-8	25 MALE TO RJ-45	4.50	3.50	3.00
MA25F-8	25 FEMALE TO RJ-45	4.50	3.50	3.00

BALUNS - COAXIAL ELIMINATORS

Eliminate costly and cumbersome coaxial cable with these baluns.

Model #	Description	1-49	50-99	100-UP
BL01	MALE BNC TO RJ-11	9.95	8.50	7.00
BL05	MALE TWINAX TO RJ-11	19.95	16.00	14.00

D-SERIES AND RIBBON CABLE CONNECTORS

SOLDER POT

Part #	1-49	50-99	100-499
9P	0.75	0.56	0.45
9S	0.80	0.60	0.48
15P	1.03	0.78	0.62
15S	1.10	0.83	0.66
19P	1.62	1.22	0.97
19S	1.62	1.21	0.97
25P	1.10	0.83	0.66
25S	1.20	0.97	0.78
37P	2.14	1.61	1.28
37S	2.41	1.81	1.45
50P	2.62	2.38	2.18
50S	3.70	3.36	3.08

RIBBON CABLE TYPE

Part #	1-49	50-99	100-499
IDC9P	2.35	2.17	2.01
IDC9S	2.53	2.34	2.17
IDC15P	3.10	2.86	2.66
IDC15S	3.25	3.00	2.79
IDC25P	3.73	3.09	2.62
IDC25S	3.73	3.09	2.62
IDC37P	4.75	4.38	4.07
IDC37S	5.63	5.20	4.83
IDC50P	12.98	11.98	11.13
IDC50S	14.47	13.35	12.40

IDD DIP PLUG CONNECTOR

Part #	1-49	50-99	100-499
IDD14	0.85	0.77	0.71
IDD16	0.95	0.86	0.79
IDD24	1.65	1.50	1.38
IDD40	2.75	2.50	2.29

IDP PLUG CONNECTOR

Part #	1-49	50-99	100-499
IDP20P	4.95	4.50	3.95
IDP34P	5.95	5.50	4.95

IDE EDGECARD CONNECTOR

Part #	1-49	50-99	100-499
IDE10	1.30	1.16	1.04
IDE14	1.55	1.38	1.24
IDE20	1.48	1.27	0.98
IDE26	1.67	1.43	1.25
IDE34	2.04	1.75	1.25
IDE40	2.60	2.23	1.95
IDE50	2.97	2.54	2.23

IDS SOCKET CONNECTOR

Part #	1-49	50-99	100-499
IDS10	0.65	0.56	0.49
IDS14	0.74	0.64	0.56
IDS16	0.88	0.75	0.66
IDS20	0.93	0.79	0.70
IDS26	1.21	1.03	0.91
IDS34	1.58	1.35	1.05
IDS40	1.95	1.67	1.46
IDS50	2.32	1.99	1.74
IDS60	2.78	2.39	2.09

PC MOUNT RIGHT ANGLE

Part #	1-49	50-99	100-499
R9P	1.60	1.45	1.33
R9S	1.62	1.47	1.35
R15P	1.52	1.38	1.27
R15S	1.54	1.40	1.28
R25P	1.96	1.78	1.63
R25S	1.98	1.80	1.65
R37P	2.94	2.67	2.45
R37S	2.98	2.71	2.48

BREAKAWAY HEADER - STRAIGHT

PRICE/QTY.

Part #	1-49	50-99	100-499
IDH10B	0.28	0.25	0.23
IDH14B	0.39	0.35	0.32
IDH16B	0.44	0.40	0.37
IDH20B	0.55	0.50	0.46
IDH26B	0.72	0.65	0.60
IDH34B	0.94	0.85	0.78
IDH40B	1.10	1.00	0.92
IDH50B	1.38	1.25	1.15

BREAKAWAY HEADER- RIGHT ANGLE

PRICE/QTY.

Part #	1-49	50-99	100-499
IDH10BR	0.36	0.33	0.30
IDH14BR	0.51	0.46	0.42
IDH16BR	0.58	0.53	0.48
IDH20BR	0.73	0.66	0.60
IDH26BR	0.94	0.86	0.79
IDH34BR	1.23	1.12	1.03
IDH40BR	1.45	1.32	1.21
IDH50BR	1.81	1.65	1.51

57 SERIES SOLDER TYPE

Part #	1-49	50-99	100-499
57-24P	3.68	3.35	3.07
57-24S	3.60	3.27	3.00
57-36P	2.95	2.30	1.95
57-36S	3.66	3.33	3.05
57-50P	5.12	4.65	4.27
57-50S	5.92	5.38	4.93

57 SERIES RIBBON CABLE TYPE

Part #	1-49	50-99	100-499
ID57-24P	5.00	4.62	4.29
ID57-24S	5.50	5.08	4.71
ID57-36P	3.95	3.25	2.70
ID57-36S	5.50	5.00	4.58
ID57-50P	7.52	6.94	6.44
ID57-50S	8.03	7.42	6.89

EMPTY CRIMP SHELLS

Part #	1-49	50-99	100-499
C9P	0.70	0.46	0.32
C9S	0.70	0.48	0.34
C15P	0.73	0.52	0.36
C15S	0.73	0.53	0.37
C25P	0.75	0.54	0.38
C25S	0.75	0.57	0.40
C37P	0.96	0.87	0.80
C37S	1.00	0.91	0.83
C50P	1.12	1.02	0.83
C50S	1.14	1.04	0.95

CRIMP CONTACTS

Part #	1-99	100-999	1K-4999
CP20P	0.08	0.043	0.038
CP20S	0.10	0.054	0.048

CRIMPING TOOLS

EC1000	economy crimp tool	12.95
CT 8644	economy ratchet crimp tool	39.95
PA1645	deluxe ratchet crimp tool	89.95

Call for information on these and other crimping tools

EXTRACTOR TOOL

EXT-1 Removes and inserts crimp contacts $2.75

HARDWARE D-SERIES

PRICE/QTY.

Part #	1-49	50-99	100-499
MDH-1	0.55	0.36	0.30
FDH-2	0.75	0.56	0.46

RS-232 WALL PLATES

PRICE/QTY.

Part #	1-9	10-24	25-49
WP9-1, WP15-1, WP25-1, BNC-1	1.88	1.36	1.25
WP9-2, WP15-2, WP25-2, BNC-2	2.13	1.55	1.42

HOODS AND COVERS

SHIELDED HOODS

Part #	1-49	50-99	100-499
SH9	0.75	0.64	0.56
SH15	0.76	0.65	0.57
SH25	0.89	0.69	0.61
SH37	1.72	1.56	1.43
SH50	2.37	1.90	1.58

GREY HOODS

Part #	1-49	50-99	100-499
GH9	0.68	0.47	0.42
GH15	0.80	0.56	0.50
GH25	0.85	0.64	0.58
GH37	1.06	0.96	0.88
GH50	1.10	1.00	0.92

HOODS W/THUMBSCREWS

Part #	1-49	50-99	100-499
GH-25TS	1.30	1.10	0.90
SH-25TS	1.40	1.22	0.95

METAL HOODS

Part #	1-49	50-99	100-499
MH9	1.75	1.56	1.40
MH15	2.00	1.78	1.60
MH25	2.13	1.89	1.70

UNIVERSAL HOODS

Part #	1-49	50-99	100-499
SRH-9	1.00	0.80	0.67
SRH-15	1.07	0.85	0.71
SRH-25	1.13	0.90	0.75

GENDER CHANGER HOODS

Part #		1-49	50-99	100-499
GCH9	for 9 pin connectors	0.78	0.69	0.56
GCH15	for 15 pin connectors	0.93	0.82	0.67
GCH25	for 25 pin connectors	0.93	0.82	0.67
GCH37	for 37 pin connectors	1.75	1.56	1.27

ALLSOP® COMPUTER ACCESSORIES

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Not all products listed are shown.

DISK FILES

Model #	Description	Cost Each	Cost Ea. Case 12
	Bronze Smoke Top - Pearl Grey Base		
A. DF60	Disk File 60-holds 60-5¼" disks	$7.99	$7.00
DF60L	Same as above with lock	$9.99	$8.67
B. DF30M	Disk File 30-holds 30-3½" disks	$7.99	$6.67
DF30ML	Same as above with lock	$9.99	$8.33
C. DF10	Disk file 10-holds 10-5¼" disks	$3.99	$3.25
DF10-3	Disk file 10-Three Pack	$9.99	$8.75
DF10M	Disk file 10-holds 10-3½' disks	$4.99	$3.92
DF5	Disk file 5-holds 5-5¼" disks	$2.20	$1.83
DF5M	Disk file 5 Micro-holds 5-3½" disk	$2.40	$2.00
D. PS1	Universal Printer Stand	$11.99	$10.00

DISK DRIVE CLEANING KITS

Model #	Description	Cost Each	Cost Ea. Case 12
E. CK1	Cleaning kit for 5¼" Systems	$13.99	$11.67
CK3	Cleaning kit for 3½" Systems	$14.99	$13.25

DATA HEAD CLEANING CARTRIDGES

Model #	Description	Cost Each	Cost Ea. Case 5
F. 54000	1/4" for DC-300/DC-600 Type Drives	$39.95	$33.75
54010	Refill kit for DC-300/DC-600 Type Drives	$11.95	$10.83
54100	1/4" for DC-1000/DC-2000 Type Drives	$33.95	$28.75
54110	Refill kit for DC-1000/DC-2000 Type Drives	$9.99	$9.17

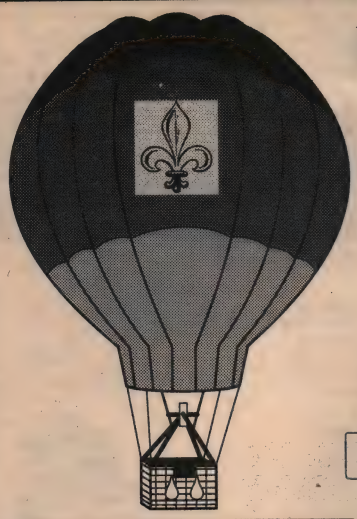
KALMAR® TEAKWOOD® COMPUTER ACCESSORIES

Enhance and warm your surroundings with these finely crafted computer accessories made of beautiful teakwood.

A.	452	Micro Disk Cabinet - holds 45, 3½" disks	$17.95
	453	Double Micro Disk Cabinet-holds 90, 3½" disks	$27.95
	454	Floppy Disk Cabinet - holds 50, 5¼" disks	$24.95
	455	Floppy Disk Cabinet - holds 100, 5¼" disks	$36.75
B.	456	Double Floppy Disk Cabinet - holds 110, 5¼" disks	$39.95
C.	469	Desktop Printer Stand-16"Wx14"Dx6"H	$27.75
	470	Desktop Printer Stand-24"Wx14½"Dx6"H	$35.95
	471	Monitor Turntable-13¼"Wx15¾"D	$27.75
	472	Monitor Turntable-18¾"Wx15¾"D	$29.95
	474	Monitor Turntable-23¾"Wx16"D	$48.50
	481	Keyboard Drawer Support System	$74.95
D.	482	Vertical CPU Stand	$29.95

VERBATIM® DATALIFE® AND BONUS® DISKETTES

		Box of 10	10 Boxes
DataLife® Plus with Teflon®			
87066	5¼" DS/DD Teflon® 360K	$12.15	$11.29
DATALIFE®			
18188	5¼ DS/DD - 360K -	$10.15	$9.43
86026	5¼ DS/HD - 1.2 MB -	$20.15	$18.71
90096	3½ SS/DD - 720K -	$14.31	$13.29
90097	3½ DS/DD - 1.2 MB -	$20.15	$18.71
86269	3½ DS/HD - 1.44 MB -	$51.00	$48.90
BONUS®			
86054	5¼ DS/DD - 360 K -	$6.31	$5.86
86470	5¼ DS/HD - 1.2 MB -	$16.15	$15.00
86467	3½ SS/DD - 720 K -	$13.08	$12.14
86466	3½ DS/DD - 1.2 MB -	$16.92	$15.71



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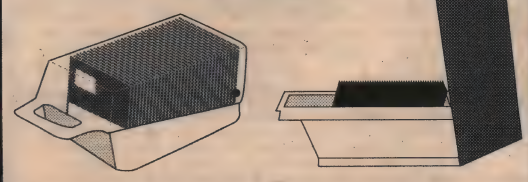

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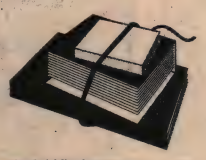

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EG#3A—EGA DEMOS #1: SCREEN DAZZLE!!!
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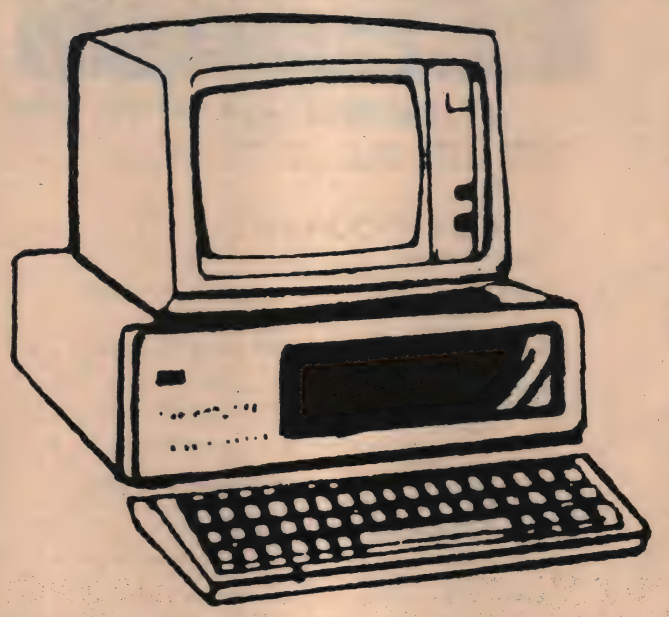

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AMIGA

The Amiga Workbench

by Ervin Bobo

Finally the dam that held back Amiga software has broken and new programs are flooding in in much greater numbers than in months past—so much so that the problem this month is in picking out the best ones for review and comment. It's a problem I like having.

Some time ago I wrote of a program called TV*Text, which used a variety of fonts, styles, colors and basic graphics shapes and patterns and allowed the creation of titles for TV productions, either professional or home movie type. Now an addition to that program has arrived and used together or separately they will add life and fire to either conventional (taped) or desktop video.

The new program is called TV*Show and with it you can use IFF images from almost any source to create sequences that are "animated" in a variety of ways. Even better, I was able to create a twenty second sequence in just under thirty minutes (once I'd got past a simple problem) and I think that makes TV*Show the easiest to use program of it's type.

As a rule, when encountering a new productivity program, I boot it up and go looking for samples and examples of what the program can do and this method answers two immediate questions: Am I interested in what the program does? And does it do it well? In the case of TV*Show, the most striking example was the tutorial, itself created with TV*Show, and thus doing a triple duty of showing what the program does, how well it can do it, and leading you through the steps necessary to let you create your own works.

Completely mouse-driven, TV*Show first asks for a name for your script and it will need this as a tool whether or not you intend to later save the program. In the naming, you are also specifying the directory path needed to find the script and to find the images used in the script.

In my case, to help my son with a class project, I had already saved as "brushes" all the separate elements from the "Fantasy" file on Deluxe Paint. Since these were already on a disk, I used that same disk to store the script and I feel this is the best way to do it: keep everything in one place.

Pulldown menus are sparse: there is one that allows saving, loading and creating a new script and that's about all for they are not needed. Once you've named your script, you'll work with a series of pop-up windows, each with several buttons that will invoke the actions you wish to take place.

There are two keys to working successfully with TV*Show and the first is that, after finishing any segment, you must backtrack to the first window where you can click on the Add button; the second is that the images to be used must have been saved in the IFF format. (If they have not, simply rename them and add the suffix ".pic". Forgetting this momentarily led to the only problems I had.)

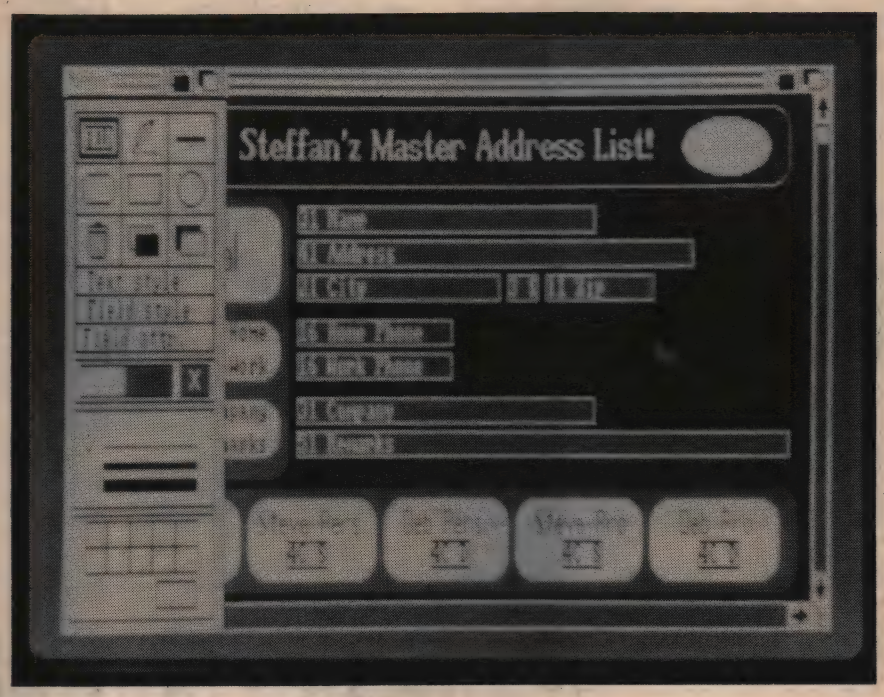
Before anything can take place in TV*Show, you must load a screen: a full-page picture to be used as a background. Click on Add, click on the icon for Screen and select from the directory that then appears. Once it has been added to your script, another screen of buttons allows you to choose such things as "Dwell" (how long the screen should be in place before the next event transpires) and "Cut" (the manner, if any, in which you wish the screen replaced by another.)

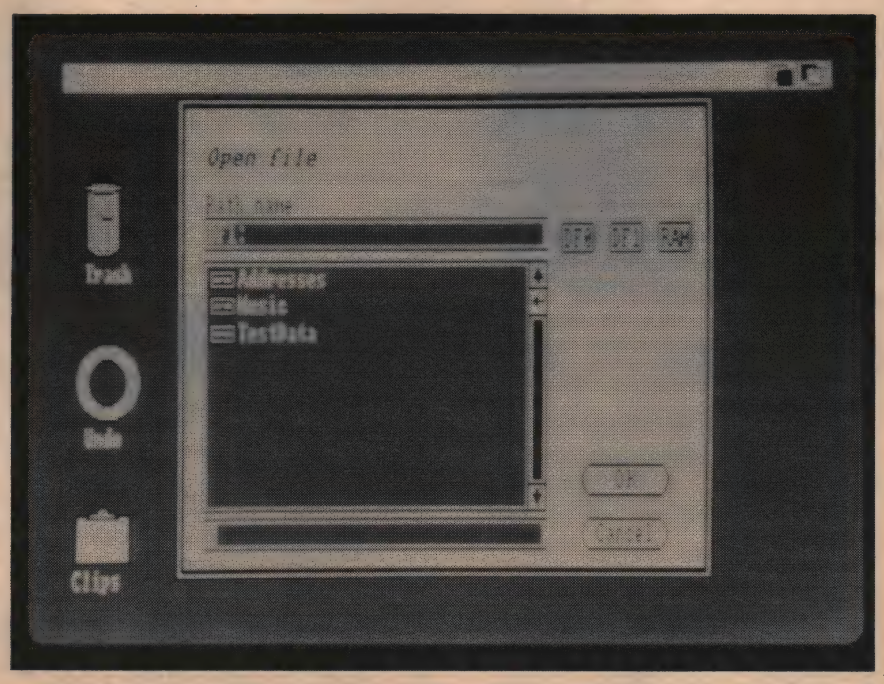
The Cut menu is one of the most exciting parts of TV*Show, filled with a variety of wipes from almost every

continued on page 356

The Amiga Database Survey Part 3

Reviewed by Steve Hull





Abacus Software is a name well known to owners of Commodore computers, mostly from the company's line of high-quality software for the C-64 and 128. Abacus was also one of the first companies to commit to supporting the Atari ST; DataRetrieve, a port of their ST database program, is one of several productivity titles unveiled under Abacus' first wave of Amiga software.

The first thing one notices about the main DataRetrieve screen is its distressing similarity to the Atari ST desktop, right down to the skinny trash can icon at the left—not right—side of the screen. The program bears a greater resemblance to the ST's GEM environment than any Amiga title so far. Whoever picked the startup colors needs to get his eyes checked; the screen comes up salmon red with swimming-pool green accents! As Bill the Cat has been known to say, "Ack! Phhtt!" Fortunately, you can change the default colors from within the program.

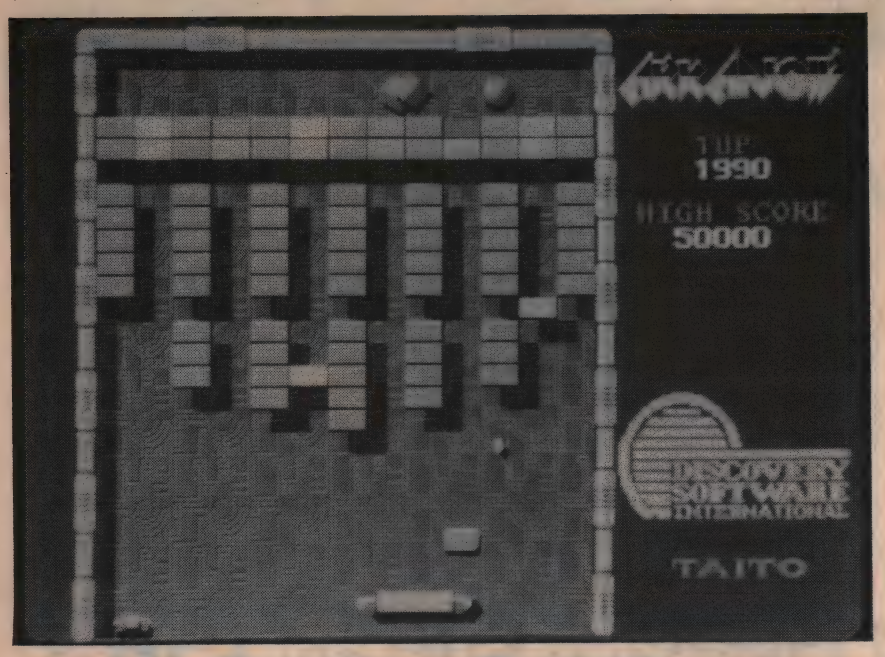
Mask Oriented

DataRetrieve is unique among the databases we have examined thus far, in that it makes extensive use of "masks" to handle data input and output. A mask is a template that determines the position at which data is displayed on screen, or printed to a printer. DataRetrieve defines default screen masks for data entry/editing, listing, and report printing. You may edit these forms or create forms of your own.

While the forms intended for printer output do not support graphics or special fonts, you can design screens using DataRetrieve's mask editor with multiple fonts, lines, boxes, even pattern fills—in up to 16 colors! The mask editor is "object oriented," with a feel more akin to desktop publishing than to a traditional drawing program. The

continued on page 358

Arkanoid By Discovery Software



Reviewed by Steve Hull

With the incredible plethora of productivity and creativity software available for the Amiga, it's easy to forget that its designers had, at first, intended the Amiga to be the ultimate video game machine. This, of course, borders on ancient history—back in the days when dinosaurs ruled the earth, Warner Communications was mismanaging Atari, and Jack Tramiel's greatest hope for the future was the Commodore Plus 4.

While many people make their living with databases, spreadsheets and word processors, sometimes you just need to cut loose and wreak the kind of good-natured mayhem that video games do so well. Arkanoid, the first game release by Discovery Software, is an ideal choice for some good old wall-bangin' fun.

The first time I saw the coin-op version of Arkanoid was over a year ago, when I had the dubious pleasure of killing two hours at San Antonio International Airport. Out of sheer desperation I wandered over to a waiting area containing several mostly outdated video games. Among the relics was a new entry by Taito America, the company that put a nationwide run on quarters with Space Invaders in the late 70s. Arkanoid did not appear to be anything exceptional; my first impression was, great, another breakout ripoff.

Well, yes and no. The basic aim of Arkanoid is the same as its predecessor; use a paddle (the documentation calls it a Vaus) that moves across the bottom of the screen to bounce an energy ball against bricks at the top of the screen, eventually breaking through all the bricks. That's where breakout leaves off—and where Arkanoid starts.

Just when you begin to think you've seen all this before, the energy ball strikes a brick, releasing an elongated Power Capsule that begins rolling down the screen. There are seven different types of Power Capsule, identifiable by color and a letter marking each one. Each capsule has a different effect on game play when struck by the Vaus; the orange capsule marked "S" slows the energy ball, the green capsule marked "C" allows the Vaus to capture the ball for more precise aiming, and the purple capsule marked "E" expands the Vaus, making it easier to hit the energy ball. The blue "D" capsule is a disrupter, splitting the energy ball into three; the "B" capsule breaks open a doorway that can teleport the Vaus to the next level of play, and the gray "P" capsule awards an extra Vaus. The red "L" capsule is my favorite—it transforms the Vaus into a laser-equipped battlestation, capable of obliterating bricks in rapid-fire blasts!

The bricks themselves come in ten different colors and range in point values from 50 to 120. Most of the bricks can be dispatched with one impact of the energy ball, but the steely gray bricks can take up to five hits—and the gold bricks are indestructible.

Add to this the roving obstacles—Konerds, Pyradoks, Tri-Spheres and Opopos—colorful three-dimensional shapes that slowly meander from the top of the screen to the bottom. They cannot damage the Vaus, but they can carom the energy ball back at wild angles. These wandering obstacles add a welcome element of unpredictability that keeps the game from becoming routine.

Arkanoid's many options keep game play lively. You begin with three Vaus,

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Mimetics Soundscape Utilities 1

by John Loffink

When Mimetics released the Soundscape Pro MIDI Studio in late 1986, one of its most touted and least understood features was its modularity. This was something of a new concept for Amiga Software. The modular nature of Soundscape allows it to look at extra programs as virtual devices, chaining one module to the next on the Patch Panel in the same way you would hook a cassette deck through an equalizer to an amplifier and then out to your speakers. With the release of Soundscape Utilities 1 this modularity becomes much more apparent.

Utilities 1 requires Pro MIDI Studio 1.4 (retailing at $149.00) to run. A MIDI interface is recommended, though not necessary if you only use the Amiga's internal voices and the computer keyboard. Pro MIDI Studio is a powerful sequencer program for recording live performances from MIDI keyboards or controllers into your Amiga. The recorder is actually presented as a virtual tape desk window, controlled by a separate clock window. Single step, cut and paste, and punch-in/punch-out editing of MIDI data is available. Accessories include a MIDI Mixer and Sampled Sound Player for the editing and playback of Amiga voices. (For a thorough look at Pro MIDI Studio consult the article by Jeff Burger in the March *Computer Shopper*.)

Utilities 1 comes on a single disk with a 32 page manual for $49.95. Ten disk examples demonstrate the different uses of the modules. The modules are Install Modules, Mouse Bender, Mapper/Splitter, SystemX, Fuel Gauge, Clock Scaler, Frame Counter and Smooth Clocker. Install Modules simply lets you modify the startup sequence in your Soundscape Workbench disk without requiring the use of a text editor and an understanding of the CLI commands. It lets you determine which modules boot up in the Soundscape Patch Panel and define the default drives for data and modules.

Mouse Bender takes mouse movements in the X and Y axes and converts them to MIDI PitchBend, AfterTouch or Controller data. The Edit Bent Mouse window gives X and/or Y axis selection and slider amount for each and Controller and MIDI Channel numbers. While in the initial performance, it is easier to use your synthesizer's pitchbend and modulation wheels, if you decide to add or modify this information after the notes are recorded the mouse is much closer at hand. Mouse control of Aftertouch lets those without a pressure sensitive keyboard to generate this data easily for any modules or synthesizers that recognize it. Strangely enough, many synthesizers will respond to control data that their own keyboards will not produce. Another example is the Yamaha synthesizer family, designed to respond to Breath control data on MIDI Control #2. In the Yamaha TX81Z FM Tone Generator breath control (and no other controller) can affect the output level of each envelope of the four operators per voice. Without one of Yamaha's WX7 MIDI Wind Controllers, a MIDI Mapper or MouseBender, this control parameter is unavailable for use.

Mapper/Splitter alone is worth the price of this package. It accomplishes in software what a $750 Axxess Mapper does in hardware. Mapper/Splitter takes input data from a Patch Panel module on any specified MIDI channel, scales and shifts a specified range, and outputs it to any other MIDI data on any MIDI channel. Mapped data includes note on/offs, poly pressure, control change, program change, mono pressure and pitch bend.

continued on page 366

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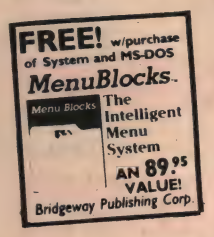

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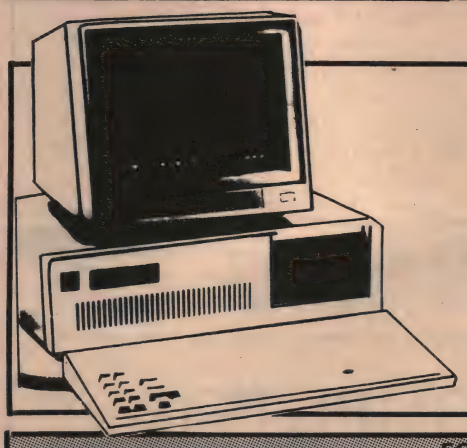

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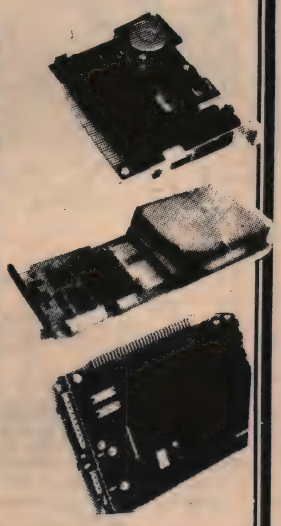

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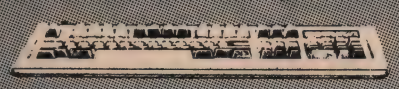

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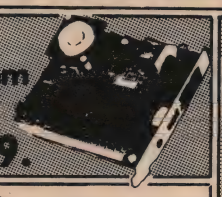

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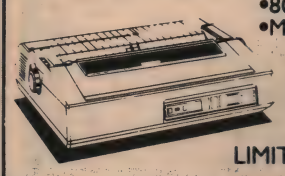

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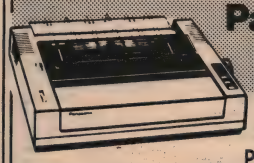

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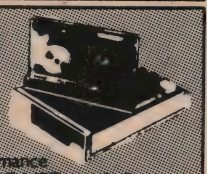

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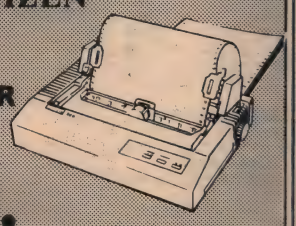

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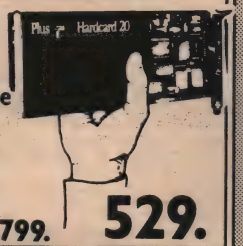

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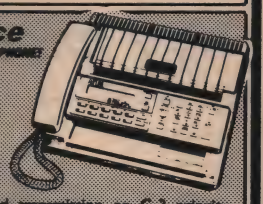

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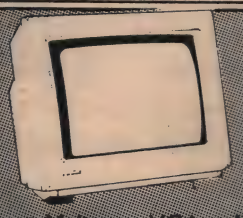

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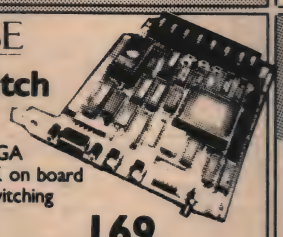

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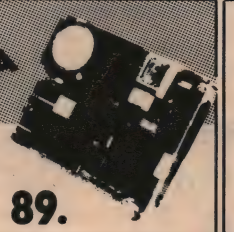

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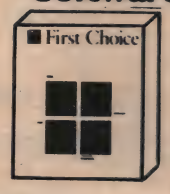

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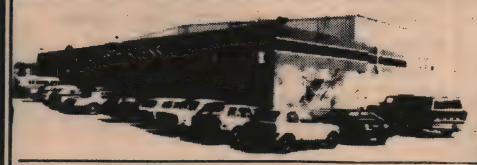

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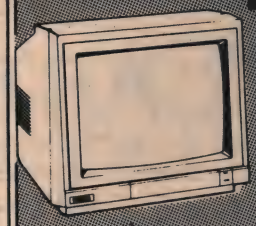

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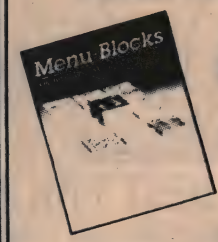

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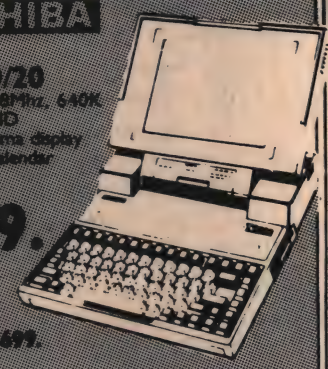

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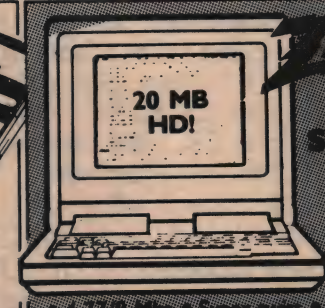

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ATARI ST

Updates On Three *Computer Shopper* Articles

by D. F. Scott

I love reader response. The computing community is vast and populous, and its channels of communication are bi-directional. *Computer Shopper* encourages its readers to speak their minds, and will be involved in the creation of new and innovative ways to facilitate the channel of reader response.

In this article, I reply to some of these responses. I like mail which sends me back to the books, which challenges me, keeps me on my toes. If the following four selections are indicative of the majority of *Computer Shopper* readers, I'll be walking like Rudolf Nureyev before long.

The Last Operating System?

In the October 1987 *Computer Shopper*, I discussed the direction the microcomputer operating system could—and perhaps should—be headed, in an article entitled The Next Operating System: Some New Ideas. One of the keys to the system I proposed is multi-tasking, though with a user-controlled On-Line Interpreter capable of manipulating the same data each process is referencing, at the time it's being referenced.

Ulysses B. Adams of Philadelphia, PA, writes to suggest such a system already exists. "In fact," he states, "it has just about passed into oblivion. I am speaking of the Sinclair QL." The QL is a sleek, black 16-bit machine whose primary domain has been Europe, and whose designer is the imaginative, often digressive, Clive Sinclair. Mr. Adams points out the QL uses an implementation of BASIC as its operating environment, with many of the variables relating to multi-tasking and process control manipulable through BASIC, right down to the division of time cycles allocated to each process.

In my discussion of the hypothetical On-Line Interpreter, I stated its interpretive language structure should be based on BASIC—a language which used to be the operating system for the first mass-market micros. Many relational database interpretive structures are derivatives of BASIC anyway; it seems computer designers removed BASIC from system architecture only to sell it back to us later in a separate package.

With HyperCard now being shipped free with Macintoshes, the interpretive language is being reintroduced as a computer's standard equipment. Not even Apple, however, is quite sure just what HyperCard is supposed to do; its official advertising limits it to "just about anything," which provokes salesmen to say, "Who knows what it is; it's free, why question it?" It's difficult for a buyer to find purpose in a machine when the seller is just as much in the dark as the buyer.

Clive Sinclair, at least in America, has been no marketing genius, but he is an engineering wunderkind. When you see the ethic which states the public should have access to the newest technology at a low price, peel off the name "Jack Tramiel" and you'll find Clive Sinclair. Some of Sinclair's ideas have been, in my view, ridiculous—the use of EPROM chips smaller than your thumb as read-only program storage, for instance. Assuming you lost your original copy, and it turns up in your shirt pocket after having survived the washer/dryer, what then? Ideas have to be tried, though, before they can be proven; and Sinclair has had the guts to put ideas in practice, to make the public his beta testers. Thanks for the input, Mr. Adams.

The Same Operating System??

Anybody who isn't familiar with the Great ST vs. Amiga Debate must be reading his first *Computer Shopper*. There are some who believe the "my computer is better than your computer" disputes are destined to be fruitless, since no participant could ever possibly accept compromise. The exception, I contend, takes place when my computer actually is better than your computer. Face it, if we technical writers didn't have personal preferences, we wouldn't be legitimate.

In the Feedback Forum section of the January *Computer Shopper*, page 130, David Donnell of Fort Wayne, Indiana, contends my projected operating system concept "was almost an exact description of the Amiga's operating system." Surely, thought I, he jests.

Before I start hacking away, though, let's see where the similarities lay. The Amiga's "Intuition" allows (read: "forces") the user to enter text-based statements on a command line—one of the features of my OLI. The main operating system screen in my model is accessible at all times; such is the case with the Amiga.

Mr. Donnell claims there is another similarity: that both systems truly multi-task. I contended in my article that by sectioning off memory for exclusive use by separate programs, but switching program control between those individual sections, neither AmigaDOS nor Microsoft Windows achieves true multi-tasking.

Donnell warned me never to include AmigaDOS and Windows on the same page again, stating he felt it was "true, Microsoft Windows is not true multi-tasking, but the Amiga is a true multi-tasking machine, and it is by Mr. Scott's definition of multi-tasking." He cited an article in the September 1986 issue of *Byte* in which True BASIC developer Adam Brooks Webber praised what he considered to be true multi-tasking in AmigaDOS, which in his view put that machine on a level above the Macintosh. Webber had yet to work on True BASIC for the ST.

In his *Byte* article, Webber states, "A multi-tasking system is one that runs several independent programs at once, giving each the impression that it is the one and only." I looked over that sentence numerous times in a vain attempt to see in what instances Webber could be correct. I fail to see how any multi-tasking environment could survive crashing past the first half-second after being booted if each process in the queue were led to believe it had free reign over the system.

The key to multi-tasking is open-endedness, or each process sharing the responsibility of fulfilling a single designated purpose. Running WordPerfect and playing Marble Madness concurrently may be multi-tasking to some, but to a programmer who fails to see a single purpose in the two programs cohabitating the system, it is not.

Whitesmiths, Ltd., a member of the Institute of Electrical and Electronic Engineers, in its official guidelines defines multi-tasking in this manner: "Many tasks are controlled by the executive [a mainframer's terms for "operating system"] at one time, and their execution is interleaved." "Interleaved" is the key word here; it means that each process not only runs concurrently with one another, but in unison. The execution of a portion or "slice" of one process leads directly to the execution of a portion of the next process in the queue without disrupting the single overall objective.

In order to accomplish that objective, the processes must share more than mere data. They must swap spaces with

continued on page 214

GFA Artist Offers 1,000 Colors

MichTron presents GFA Artist, a vivid new animation program for the Atari ST that allows you creative flexibility. "It contains every possible graphic and animation function one could possibly ever use..." (*ST World*, Sept. 87).

Use GFA Artist to create pictures and complex animation forms and save them to disk. A special included program allows you to save them in a film file (a run-only version used without the program) so you can distribute your films to friends who don't own GFA Artist (yet!).

GFA Artist combines many special features of other animation programs into one package. You can incorporate text into your pictures in one of the four provided fonts or in a custom font you create with the Font Editor. You can create a cycling color effect, and even define your own fill pattern from part of your picture, instead of using a standard GEM fill pattern. You can merge several film files that have a file in common into a single file with the Film Merger. The Run Only Interpreter allows you to make extended films consisting of up to 20,000 frames.

GFA Artist effectively utilizes 2 different modes: Low-Res, the normal low resolution mode, and Low-Res Static, that lets you use over 1,000 colors on the screen at the same time! This is an ideal tool for making pictures with color-transitions for a rainbow effect.

Work in both low and medium resolution simultaneously! The special Function Selection Box integrates both low and medium resolution into one screen, combined with multiple palettes. You have the advantage of using the 80 character mode (medium resolution) for function selection together with the low resolution mode for art-work. This makes pull-down menus unnecessary.

For speedy constructions and wiz tricks, GFA Artist integrates machine language with GFA BASIC. The mouse is used as the control and input device wherever possible instead of the keyboard for ultimate ease of use! The size of your sprites is only limited by the size of your screen. The program is automatically compatible with all standard screen formats (DEGAS, Color Star, Neochrome). These conveniences add to the pleasure of creating and perfecting full color animation with your computer.

GFA Artist, from MichTron for $79.95, makes advanced creativity accessible and convenient! GFA Artist requires an Atari ST with 1MB of RAM, TOS in ROM, and a color monitor.

For more information contact: MichTron Inc., 576 S. Telegraph, Pontiac, MI 48053; (313)334-5700, Telex 350409. ●

MichTron Software For Kids

MichTron announces the release of PreSchool KidProgs, a set of three creative programs designed to stimulate the development of young children, for the Atari ST computer.

The programs feature creative activities that will captivate the interest of young children.

KidGrid+ is a drawing program with 192 triangles that the child can fill with one of 12 colors. Their artistic and graphic abilities now can be developed without the mess of paints and crayons! KidKeys allows the child to pick-a-tune from 20 songs or play music by themselves on the three octave keyboard with either a piano or organ sound. This produces a familiarity with fundamentals of music at an early age, and the included lyrics allow them to sing along with favorite songs that will be remembered for a lifetime. KidBlocks is an on-screen, multi-sided block puzzle for the child to unscramble. Their visualization and problem-solving abilities will be challenged and encouraged with the rewards of music and special effects when they triumphantly complete the different puzzles.

Preschool Kidprogs offer tot-friendly features specifically designed to stimulate the development of young children. The disk encourages independence, not only in using the programs, but also in loading the disk and in program selection. Color-coding, picture icons, and consistent formats make the programs easy to learn and use. All activities are carried out using the mouse. Targets for selection by the mouse are large and easy to hit, and the child may press either or both mouse buttons with the same result. Current selections are clearly indicated through the use of color and/or sound. Alert boxes prevent exiting programs by mistake. Displays encourage left-to-right eye movements to enhance pre-reading skills. Lack of copy-protection allows back-up copies to be used by young children to prevent damage to the original disk.

Children will be fascinated with the colors, shapes, and sounds of these programs. Because they interact with the computer and it responds to them, this educational tool is more fun than any mere toy. They will become familiar with computer and keybaord use at a young age, and their self-confidence will be enhanced with the excitement of using the computer by themselves. Parents will be delighted that their child's creativity and visual, aural, and problem solving skills can be developed without hassle and without supervision!

The many specially designed features of PreSchool KidProgs make this a ParentEase, KidSafe and KidFun set of KidPrograms! PreSchool KidProgs is available from MichTron for $39.95 and requires a color monitor.

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For more informaiton contact: Microdeal, 576 S. Telegraph, Pontiac, MI 48053; (313)334-8729, Telex 350409; FAX (313)334-3553. ●

Updates continued from page 213

each other, and often share the same program code. To expedite these matters, the 68000 CPU could use some assistance from a true Memory Management Unit chip—something none of the current 68000 micros currently possess. Mr. Donnell in his letter refers to AmigaDOS' principal author Tim King, whose Cambridge thesis project consisted of taking the PDP-11's system kernel, rewriting it to perform multi-tasking, and sticking it inside a Sage microcomputer. The real feat would have been for King to have put his multi-tasking kernel back in the PDP-11; but perhaps he chose not to because the PDP-11 has no Memory Management Unit.

In order for a UNIX multi-tasking system to run on any computer, there must be memory management hardware in place. Without that, UNIX work-alike systems such as Whitesmiths' IDRIS are forced to use software-based memory relocation schemata in their "executives" to juggle process code slices from place to place. It was Whitesmiths who brought true multi-tasking to the PDP-11 and, subsequently, to the ST; perhaps Cambridge should give Whitesmiths an honorary doctorate.

In his article, Adam Brooks Webber admits he'd like to see hardware-based MMUs make their way to micros, for three reasons: first, to handle memory relocation; second, to eliminate the need to use external storage for virtual memory; and third, to establish executional priorities or heirarchies for segments of program code. "Memory management hardware like this," contends Webber, "may never become an absolute necessity for single-user systems, but it would certainly make software development easier and more fun."

Without MMU hardware for scheduling logic, UNIX work-alikes like IDRIS are forced to use hard drives for virtual memory. As we've seen, however, true multi-tasking is impossible without scheduling and relocation; so without virtual memory available to them at the very least, none of the three "MAST" 68000 machines can truly multi-task. I'm surprised Webber didn't recognize that point, for by the end of the article he made it himself.

A final note about Tim King: He does write true multi-tasking operating systems; in fact, he is the principal author of Helios, Perihelion Software's parallel processing system for the Inmos T-800 Transputers, to be tried first on Atari's experimental computer, Abaq. Thanks for the challenge, Mr. Donnell.

The Worst Of D. F. Scott

Our next letter is of the type we in the writing business who intend to stay there for very long prepare ourselves for. Should the author of the letter be reading, he should recognize his first paragraph right away: "Who are you D. F. Scott, and what are you doing writing for a computer magazine? Perhaps you freelance [I do] or work for Atari [I don't]. What you write is full of errors about computers. It also sports the occasional typo."

In short, I have had the dubious privilege of writing, for David Schenken of St. Louis, Missouri, "the worst article I have ever read"—namely, "Atari Plots a Parallel Course" from the January 1988 *Computer Shopper*. One of the truths we writers must expect is that every article will be the worst article somebody has ever read. If there are no typos at all, it is destined, in one person's eyes, for disaster. One simply can't stop writing what he knows merely because everyone's standards vary.

So with that in mind, let's take a look at each of Mr. Schenken's complaints, from the top. First, the use of the term "mnemonics" in reference to Reduced Instruction Set Computers. Schenken asks, "Can you alter the speed of the computer you are using by merely changing the way you remember the instructions the computer uses?"

Of course the answer is yes. "Mnemonics" isn't exactly the way you, the human, remember the instructions; it's really the terminology with which we make those instructions form a logical structure. A computer works opposite to the human brain. To expedite a logical message's throughput, humans employ more complex terminology whereas computers require less complex terminology. Therefore, by reducing some of the instructions whose terminology was required mostly to benefit human programmers, we speed up the actual throughput. Motorola, among others, has experimented with RISC technology in its 68000 series CPUs.

I don't know who started the rumor that all RISC instructions are the same length, or are executed in one clock cycle. The CPU has yet to be created which executes all instructions on an average of one clock cycle. The closest any microprocessor has come is the Ridge experimental CPU, and even that is in the prototype stage. A benchmark study performed by *Electronics Magazine*, published in its 3 September 1987 issue, shows an Inmos T800 averages just below two clock cycles per instruction at a clock speed of 17 MHz, with the highly-praised Pyramid Technologies 9000 averaging about 1.5 cycles per instruction, but at 10 MHz.

By a strange coincidence, a letter printed in the January 1988 *Computer Shopper* just two before Mr. Donnell's, by a Mr. F. Kuechmann of Vancouver, Washington, contains a list of alleged RISC characteristics similar to Schenken's, including that currently unrealized single clock cycle instruction set. Kuechmann feels RISC is

continued on page 372

Errata

In the April issue, the article "Power of PC/MSDOS" had errors in two of the programs: RESET.BAT and Listing 1. We are re-running both programs for your convenience.

```
GOTO START
A100
XOR     DX,DX
MOV     AX,001B
INT     17
MOV     BX,0080
MOV     CL,[BX]
XOR     CH,CH
JCXZ    011F
INC     BX
DEC     CX
JCXZ    011F
INC     BX
MOV     AL,[BX]
XOR     DX,DX
XOR     AH,AH
INT     17
LOOP    0114
INT     20
```

```
R       CX
21
n       esc.com
w
q

:START
DEBUG < MAKE-ESC.BAT
```

Listing 1
These batch files are designed to be used with the ESC.COM program in the main article.

If your printer is Epson-compatible, the system will work as written. If you have another brand of printer, substitute the appropriate commands. Create these files using the COPY CON command or use your favorite text editor in its ASCII Mode. RESET.BAT—Sets the printer to its default mode.

```
ECHO OFF
CLS
ESC @
```

PICA.BAT—Sets pica (10 characters/in.)

```
ECHO OFF
CLS
ESC P
```

ELITE.BAT—Sets elite (12 characters/in.)

```
ECHO OFF
CLS
ESC M
```

CONDENSE.BAT—Sets condensed type.

```
ECHO OFF
CLS
ESC ^O REM **<Ctrl>+<O>**
```

TINY.BAT—Sets microtype (20+ characters/ in.)

```
ECHO OFF
CLS
ESC M
ESC ^O REM **<Ctrl>+<o>**
ESC S1
ESC 1
```

italic.bat—Sets italic mode

```
ECHO OFF
CLS
ESC 4
```

unitalic.bat—Cancels italic mode

```
ECHO OFF
CLS
ESC 5
```

WIDE.BAT—Sets double-width type

```
ECHO OFF
CLS
ESC W1
```

UNWIDE.BAT—Cancels double-width

```
ECHO OFF
CLS
ESC W0
```

NLQ.BAT—Sets Near Letter Quality mode.

```
ECHO OFF
CLS
ESC x1
```

UNLQ.bat—Cancels Near Letter Quality

```
ECHO OFF
CLS
ESC x0
```

6lpi.bat—Sets 6 line/in. spacing.

```
ECHO OFF
CLS
ESC 2
```

8lpi.bat—Sets 8 line/in. spacing.

```
ECHO OFF
CLS
ESC 0
```

10LPI.BAT—Sets 10 line/in. spacing.

```
ECHO OFF
CLS
ESC 1
```

BOLD.BAT—Sets Boldface.

```
ECHO OFF
CLS
ESC E
```

NOBOLD.BAT—Cancels Boldface.

```
ECHO OFF
CLS
ESC F
```

UNDRLINE.BAT—Underlines all text.

```
ECHO OFF
CLS
ESC -1
```

NO-UNDER.BAT—Cancels underlining.

```
ECHO OFF
CLS
ESC -0
```

2STRIKE.BAT—Starts double-strike mode.

```
ECHO OFF
CLS
ESC G
```

1STRIKE.BAT—Starts single-strike mode.

```
ECHO OFF
CLS
ESC H
```


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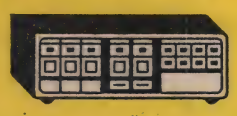

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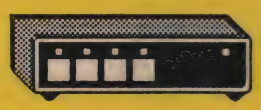

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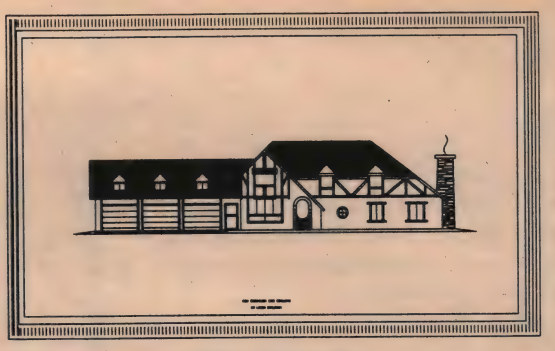

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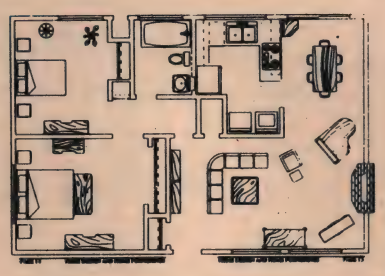

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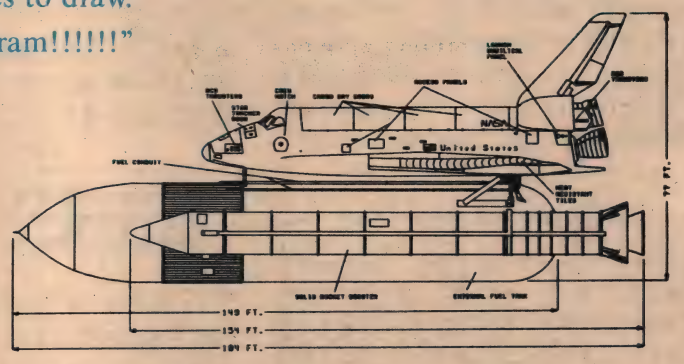

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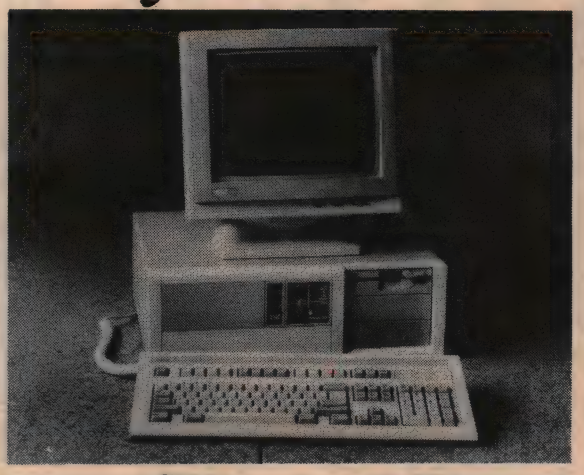

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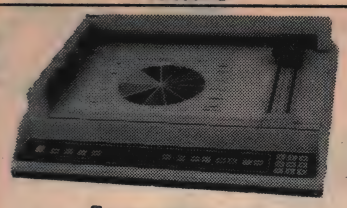

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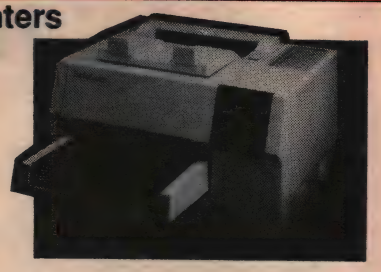

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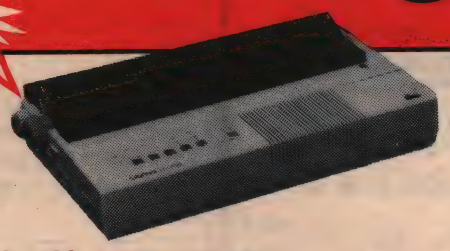

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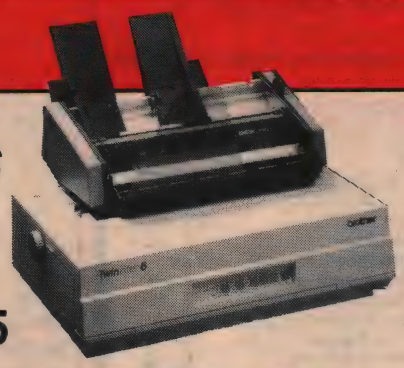

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SINCE 1977

COMPUTER BOOKS

Six Mini Book Reviews

by George M. Ewing

1. *Turbo Pascal Advanced Applications* (Judie Overbeek, Ed.) Rockland Publishing, (1987) ISBN 0-939621-00-2, 207 p., 8½"x11" softbound. (Companion disk for $15 ppd.)

This book, by a small but excellent publisher in Columbia Falls, MT, is a very interesting collection of sixteen short technical chapters by more than a dozen different experts in the field. These cover everything from data encryption and program optimization to bit-mapped and GKS/CORE graphics, even a complete section on writing your own "Tiny" Turbo Pascal subset compiler, using a set of just 25 grammar rules and a compiler-generating utility program like "Qparser." There is even a section on optimizing memory in CP/M-80 Turbo applications, though it is the only such section; everything else concerns running Turbo Pascal on IBM PC compatibles.

Appendices in the back of the book give mini-reviews of 30 useful Turbo Pascal aftermarket products, and also several of the better textbooks, though these are a little out of date by now. There is a great deal of useful information here for the many thousands of users who are running version 3.0 or earlier of Borland's compiler on the PC. The recent release of Turbo v.4.0, with its system of separate compilation, will make sections like Chapter Nine's coverage of the 64K data memory limit obsolete for buyers of the new release and the associated toolboxes. However, the very large installed user base for the earlier versions should still make this text a success. Please note there is nothing specific here for Macintosh Turbo Pascal users, either.

2. *Micro to Mainframe Data Interchange* by Michael Simon Bodner. TAB/TPR Books. (1987) ISBN 0-8306-2940-8, 273 p., $26.95/Hardback.

This is a combined introduction and reference for programmers and relatively sophisticated business users on getting data back and forth from a mainframe DBMS like to individual PCs and LAN configurations. Its main focus is on business users who need to extract data from very large databases and then import it into some of the more popular applications such as Lotus, dBase, etc. Another alternative, using products like Oracle and PC Focus that exist in both worlds, is also explored.

Roughly the last 40% of the book consists of listings for TDF (Text Description File) programs that are intended to bridge the gap, and that can be compiled with a program such as Clipper for the dBase ones, or QuickBASIC for the BASIC code, as well as a short user's manual. The first six or seven chapters give a good "how-it-works" technical review for the non-programmer as well.

3. *Amiga BASIC Inside and Out* by Hannes Rugheimer and Christian Spanik. Abacus. (1988) ISBN 0-916439-87-9, 548 p., $24.95. Companion Disk—$14.95 + $2 S&H.

This text, by the American subsidiary of the German software publisher, Data Becker GmbH, is a very comprehensive treatment of BASIC on the Amiga. The six main chapters cover graphics, file management, and sound and speed synthesis. Appendices include a 75 page command reference section, a glossary and error message table, and long listings for 7 utility programs, which are also available on disk from the publisher.

The publisher also offers a number of other books on the Amiga, as well as a commercial word processing program called TextPro. Their many Commodore C-64 and C-128 books, which were apparently very big sellers in Europe, are getting hard to find in this country, though most of them are supposedly still in print.

4. *High Performance Interactive Graphics—Modeling, Rendering, and Animating for IBM PCs and Compatibles* by Lee Adams. Tab Books. (1987) ISBN 0-8306-2879-7, 403 p., $22.95. Companion Disk: $24.95 + $1.00 S&H.

This is a very comprehensive text on graphics for the PC, with five sections and 28 chapters, covering everything from modeling and surface mapping to wire-frame industrial design, CAD environments, and architectural design. Sample source code listings are given for many of these, and are available from the publisher on disk. However, all the programs are in BASICA or GW BASIC, Compaq BASIC, etc., and in order to get the software to run at a reasonable speed, these programs have to be compiled with a fast BASIC compiler like Microsoft QuickBASIC or Borland's Turbo BASIC.

Two appendices in the back of the text give hints on converting for these compilers, as well as some generic hints for more ambitious programmers who want to adapt the generic programming

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Computer Book List

IBM PC Advanced Troubleshooting & Repair
Brenner
Howard W. Sams & Co.
$24.95
Pages: 286
Copyright: 1987

Written especially for intermediate to advanced computer technicians, students, and hobbyists, it goes beyond existing documentation and technical manuals to provide the most up-to-date techniques for quick and easy troubleshooting and repair of the IBM PC. This book is the perfect companion to the *IBM PC Troubleshooting & Repair Guide* and *IBM Model 5150 Computerfacts*. An in-depth description of the PC system operation, techniques, tricks, and tools of the trade, troubleshooting programs, etc. is given.

Using VersaCAD
James E. Fuller
Delmar
$32.95
Pages: 330
Copyright: 1988

This long awaited book, has sold its way onto the best selling charts in no time flat!! With an enclosed Student Diskette, this book is aimed at stepping you through the intricacies of VersaCAD. For those who have been waiting for a good book on VersaCAD you got it!! There is an instructors manual available as well.

Mastering WordStar Release 4
Greg Harvey
Sybex
$19.95
Paperback
Copyright: 1987

The 125 new features and enhancements to WordStar are highlighted throughout the text and illustrated with examples and quick, step-by-step tutorials. *Mastering WordStar Release 4* is a complete reference to using all the features in this powerful new package.

At press time, MicroPro had announced Rel. 5 (!) due in May (Comdex?)—A title will be available soon after, *Practical Techniques in WordStar Rel. 5*, By: Arca, Price: $19.95.

***Using Enable,* 2nd, Ed.**
Charles Spezzano, Ph.D.
Que Corp.
$21.95
Trade: 1988

Using Enable, 2nd Ed. is the complete guide to Version 2.0 of Enable, the integrated program from The Software Group. Users can learn and apply all the features in the word processor, spreadsheet, data manager, graphics, and telecommunications modules of

continued on page 373

New Spreadsheet Books!

A quick run through the list of book titles available, shows as can be expected, that 1-2-3 dominates almost to exclusion.

However, always searching for the alternative, here are some books that cover alternative spreadsheets.

Mastering Dac-Easy
By: Mosich & Chamberlain
Pub: Scott Foresman
$19.95

Using Enable
By: Spezzano
Pub: QUE Corp.
$21.95

Mastering Enable
By: Bishop
Pub: Sybex
$22.95

Using Quattro
By: Cobb
Pub: Osborne/Borland
$21.95

Mastering Symphony 3rd Ed
By: Cobb
Pub: Sybex
$24.95

Excel in Business
By: Cobb
Pub: Microsoft
$22.95

Mastering Excel
Macintosh Ed 2ED
By: Townsend
Pub: Sybex
$24.95

New books are constantly appearing, watch this column for further brief subject lists.

Premier Coverage Of HyperTalk For Mac Users!

Hayden Books announces *HyperTalk Programming*—the premier programmer's guide to Apple's newest and hottest system software, HyperCard, written by Dan Shafer.

HyperTalk Programming is a comprehensive tutorial covering every feature of HyperTalk including the concepts behind the language, object-oriented programming, and sample scripts for ready-made applications. It is an essential guide for all HyperCard users and programmers.

The 568-page book thoroughly explains powerful programming aides for the design and development of HyperCard applications, including the use of sound, graphics, and communications. It also presents language extensions and how to use them to extend HyperTalk with C or Pascal programming.

Topics covered include: How HyperTalk Came To Be, Object-Oriented Programming Concepts, HyperCard Refresher, HyperTalk Basics and System Messages, Control Structures, Text & Data Management, Sound and Music Basics, Math Operators & Functions, Commands, Tips, Traps & Techniques, and Tools and Programming Aids.

Dan Shafer is a well-known writer of nearly a dozen computer books and has earned a reputation as an author who clearly presents difficult ideas. His current books include *Turbo Prolog Primer, Revised Edition* and *AI Programming on the Macintosh*.

HyperTalk Programming, No. 48426, retails for $24.95 and is available at bookstores, computer stores, or direct from the publisher by calling 1-800-428-SAMS.

For more information contact Howard W. Sams & Company, 4300 West 62nd Street, Indianapolis, Indiana 46268; (317) 298-5400. ●

Advanced Commodore 128 Graphics And Sound Programming

Tens of thousands of readers have already discovered that Stan Krute knows the Commodore 64 inside and out. Now, what he did for C-64 he has done again for the Commodore 128. In this new book, Krute provides source code and detailed commentary for two commercial-quality programming projects that will push the C-128 to its limits.

The Commodore 128 is a terrific little 8-bit computer—it has great graphics and sound chips, an elegant memory management system, a sophisticated BASIC interpreter, perfect C-64 emulation, a well-designed keyboard, powerful CP/M capabilities, and plenty of possibilities for imaginative programmers. The hardware is there—and now this book provides the tools for fully exploiting the great potential of this remarkable computer.

Through two complete, hands-on programs, readers will receive a thorough grounding in both theory and practice, the goal being to enable intermediate-to-advanced C-128 programmers to solve any sound or graphics programming challenge that arises. Both programs—one a high-performance graphics package and the other a complete sound and music laboratory—include complete source code listings, which are profusely commented to prevent confusion. (Diskettes are available for those who prefer not to type in the code.)

Krute's graphics package extends BASIC 7.0's graphics commands to the C-128's 80-column screen and includes routines that can be called from BASIC or assembly language. The sound and music laboratory sports a Macintosh-like point-and-click interface, making it simple to explore the C-128's wide range of sound capabilities. Along with clear source code, each project includes notes on human and system interface issues and program design, calling structure diagrams, selected algorithms rendered in pseudo-code, and suggestions for project extensions.

Can a $200 C-128 be configured to act like a $2000 Macintosh? Yes, with the right software tools. The code and techniques provided in this book will give imaginative C-128 programmers a head start in that direction.

For more information contact TAB Books, Inc., P.O. Box 40, Blue Ridge Summit, PA 17214; (717) 794-2191. ●

Six Mini Book Reviews continued from page 221

steps to some other language such as C or Pascal. (No FORTH hints, though, which is a pity, as the threaded-code languages have a potential for substantial improvements in speed and memory size for graphics routines). Also, there is nothing much about integrating these routines into an environment such as GEM or Microsoft Windows; the index doesn't even list them. (Users interested in doing this could do worse than to get a copy of Mike Bentley's *The Viewport Technician*, reviewed here previously.)

In terms of physical layout and design, Mr. Adams has done an excellent job; the line drawings and illustrations are clear and concise, and there is a section in the middle with 16 color illustrations sowing the programs running on an IBM EGA in both 640x 350 and 640x200 pixel mode, a pleasant surprise in a softback book in this price range.

5. *Prolog Programming in Depth*. by Covington, Nute, & Vellino. Scott, Foresman, & Co. (1988) ISBN 0-673-18659-8, 506 p., $24.95. (Companion disk available.)

This is good, solid text on the Prolog family of languages, with the first seven chapters, roughly half the book, giving a generic overview. The second half, chapters eight through thirteen, deals with various AI applications, including two different inference engines, several simple expert system applications, a chapter on the symbolic logic concepts that provide the underlying direction for Prolog, and a chapter on Natural Language Processing.

Although all the programs in the text are in standard Edinburgh Prolog, most of them were developed with the Arity interpreter, and there is a long appendix that covers that variant, plus one on Borland's Turbo Prolog, and also a section on using a Prolog debugger. The code is available free from various user groups and bulletin boards, or for $15 from the University of Georgia. (See the address inside the front cover of the book.)

6. *JET—82 Challenging New Adventures* by Dave Prochnow. Tab Books. (1987) ISBN 0-8306-2872-X, 192 p., $12.95.

This is a rather specialized book for a fairly narrow range of users, but given that restriction, it is quite handy. It is a companion handbook for users of the subLogic aircraft simulator program, JET. The first 4 chapters, roughly 60 pages, is a detailed set of instructions on running the simulation, plus some basic background theory on how aircraft simulators and their real-life equivalent jet aircraft operate.

The rest of the book consists of short, one-page scenarios based on real combat missions flown by jet fighters in Korea, Vietnam, the Middle East, and even a few missions in the closing days of World War II. By tinkering with the opening menu when configuring JET for a mission on your computer system, it is possible to make the generic jet fighter approximate almost any real historical airplane. For example, by limiting the ammunition to the machine guns, fuel, range, and ceiling, and by leaving off the missiles, radar, afterburner, etc., you can turn your generic JET into a good approximation of a Korean War F-86 Sabrejet, a MIG 15, etc.

Appendices to the book include a series of mini-reviews of assorted microcomputer flight and combat simulators, a simple flight simulator in the form of a BASIC source listing for several of the popular personal computer BASICs, and twelve pages of identification charts giving line drawings of most popular jet fighter planes with their specifications, including a number of good B&W photos.

Some aviation buffs who don't have a copy of JET, or even a computer at all, may still get quite a bit of enjoyment out of the historical facts and statistics of scores of air combat dogfights, including the actual names and units of the pilots in many cases. ●

SQL: The Structured Query Language

Recently a need has developed for a flexible database language that is user-friendly enough for the casual user, yet powerful enough for the programmer and applications builder. SQL has been developed by IBM to fill that need. Because of its ingenious Query-by-Example feature, SQL is learned and understood easily by novices. It is now being implemented on both micro- and mainframe-based systems by major companies.

This book presents the complete picture of SQL. Although aimed toward computer science professionals, its hands-on approach, with many examples of each concept, make the book equally appropriate for database operators who simply want to understand and use SQL. Since SQL is rapidly becoming a part of current research into artificial intelligence applications, its use in knowledge bases and expert systems will also be explained. A further sampling of topics includes:

The Components of SQL
Data Definition Statements (DDS)
Data Control Statements (DCS)
Aggregate Functions
SQL at Work
Table Expressions and Predicates
Data Manipulation Statements (DMS)
Logical Connectives
Subqueries
Views, Indices, and Queries
Relational Algebra and SQL
Logic and SQL
Relational Calculus and SQL
Embedded SQL

Exercises (with solutions) at the end of each chapter allow readers to test what they have learned, and makes the book ideal for classroom use. A complete bibliography provides many sources of further reading for those who become interested in particular topics, and an index makes finding information in the book simple and quick.

SQL: The Structured Query Language. Order No. 3016, $16.60 paperback (FPT $16.95) ISBN 0-8306-3016-3, $24.95 hardbound ISBN 0-8306-9016-6, 200 pp., 4 illus., 7"x10" format. Publication date: May 1988. A TAB Professional & Reference book ($23.50 paper, $35.95 hard—Canadian).

For more information contact Tab Books, Inc., Blue Ridge Summit, PA 17294-0850; 717-794-2191. ●

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CPI 1200 baud int. (2 yr. wrty.)	CP12I	$89.00
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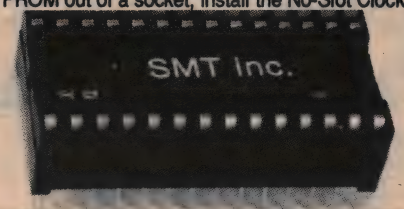

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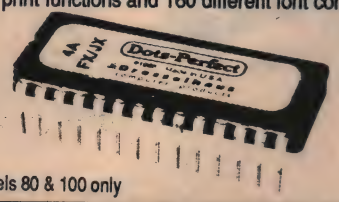

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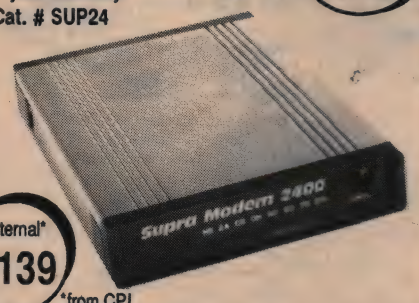

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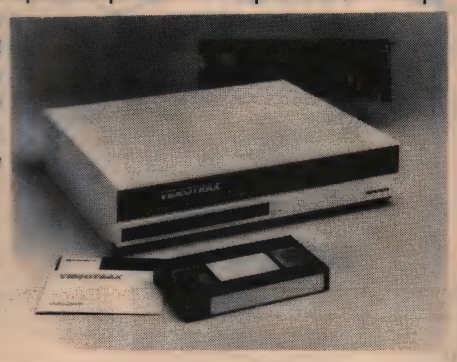

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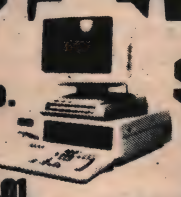

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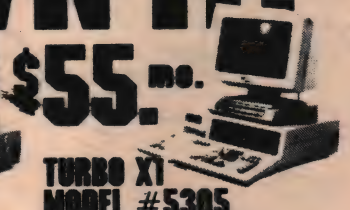

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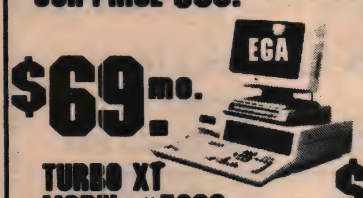

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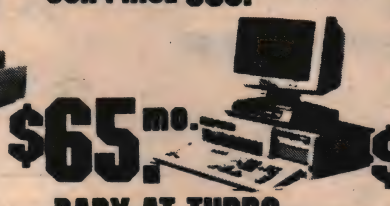

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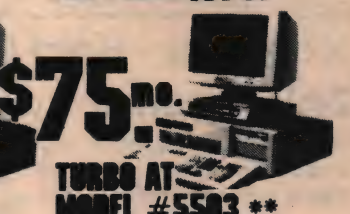

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SP-1200AS	120 CPS, Epson Compatible, Serial Interface	319	~~189~~
MP-1300AI	300 CPS, Epson/IBM Comp., Ser. & Par., Color Option	599	~~269~~
MP-5300AI	300 CPS, Epson/IBM Comp., Ser. & Par., 15" Carriage	799	~~439~~
SK-3000AI	300 CPS, Epson/IBM Comp., Ser. & Par., Color Option	649	~~369~~
SK-3005AI	300 CPS, Epson/IBM Comp., Ser. & Par., 15" Carriage	849	~~459~~
BP-5420AI	420 CPS, Epson/IBM Comp., Ser. & Par., 15" Carriage	1849	~~989~~
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GeoSynch: GeoSpell, GeoFont, And Driver Magic!

by D. Roderick Eamon

I'll never play—I really mean play—piano. Oh, I might learn music theory, but that's only half the battle. I have a genetic flaw: short fingers need not apply for the position of concert pianist. They can't stretch an octave on the ivories without discomfort.

The same's true of writing. I'm a good speller who's cursed with short fingers. I'll never truly master the keyboard (though an SX-64's undersized version helps, the 128's Function keys are impossible). Long sessions cramp muscles in the hand, which aggravates headache, back pain, and blurs vision—And you thought the writing life was wonderful!

Despite the faulty genes, I love writing. Tools that make writing tasks easier are worth their weight in gold, for poor speller and genetically inferior typist alike.

Until recently, the only document-checking route open to GEOS users was circuitous: work in another WP, then convert with Text Grabber.

Now there's geoSpell.

Spelling software intended for other WP programs have their advantages, granted. Being text-based, they work (relatively) quickly, and are (usually) easy to control. Disadvantages: for occasional users, keyboard commands are difficult if not impossible to remember. For geoWriters, it's a case of having to relearn commands, then converting the file. We have better things to do with our time than that!

The geoSpell package also includes geoFont, a font design application. We'll check out geoFont too, but for now let's have a go at BSW's spelling basher.

GeoSpell V-2.1

System Requirements: GEOS with geoWrite V-1.2 or later, C64/128, and 1541/71 drive, and joystick. Recommended additional hardware: RAM Expansion Unit or 2nd drive and mouse.

GeoSpell is a full-blown add-on program in the same vein as geoCalc, geoDex, and geoFile. On the disk: a 28,000-plus word "geoDictionary" which geoSpell accesses to check geoWrite files either on its own, or in conjunction with a user-created "Personal Dictionary." Flip-side, the usual drivers and V-1.3 applications upgrades familiar to add-on users.

GeoSpell corrects geoWrite text files from 1.2 to 2.1 (users of primitive 1.0 and 1.1 versions, upgrade!) and runs on all hardware setups. Don't fret if you've already planted graphics within the text file; geoSpell ignores them!

While geoDictionary seems small, the average American vocabulary runs five to twenty-thousand words. We employ at best a quarter of that in everyday use. As a writer more concerned with typos, 28K words is enough to satisfy most, but not all, of my own needs.

Most checkers let users create specialized dictionaries, and geoSpell is no exception. As needed, a botanist might fill a personal dictionary with Latin, a lawyer with legalese, a science fiction writer with genre-related terms. The user can add new words as they are encountered, or manually type them in while a document file is open.

Getting Under The Spell

If you've installed other GEOS add-ons, you'll find nothing new here. Just remember GEOS-128 users: Configure your 1571 to a 1541 before installation, then change back to 1571 afterwards. If geoSpell's your first add-on, follow directions! I've lost count of calls and letters from users who miss a step in the process—Validate the geoSpell disk!

After you've installed, backed-up, and created a workdisk, transfer a geoWrite text file to the workdisk. Two-drive users can put geoSpell in one drive and text files in the other. REU owners can RAM geoSpell into expanded memory to speed up program and dictionary search operations.

To open gS, double-click its Icon, or click-and-pick Open in the Command Bar's FILE submenu.

From here on, a flurry of dialog boxes appear. The first asks if you want to Create, Open, or None (don't use) a Personal Dictionary. Choose Open, pick a Personal Dictionary (if you've created one before). A third Dialog Box lets you select a geoWrite file. The main geoSpell Screen (Figure 1) draws on the monitor and word-count begins.

If a file is longer than a few pages, geoSpell breaks it down into modules 445 words long. I suspect this is: 1) to keep disk accessing to a minimum, and 2) to keep the text base resident in memory. Combined, these methods deliver a ten-fold increase in the speed geoSpell checks text.

After counting unique words in the text file, geoSpell compares them first against geoDictionary, and then the Personal Dictionary. If no misspelled words are found, geoSpell throws up a "Well-done" dialog box and kicks back to the select-a-text file box. If it finds suspect words (more likely), the Document Box fills with a region of text that includes the first questionable word.

A simple double-click on the gS Icon gets you ready to correct mistakes. Once into the program, however, you need to scan the manual.

GeoSpell's Main Screen

"So what?" you ask. "Any good checker does that. What can geoSpell do that the others don't?"

continued on page 234

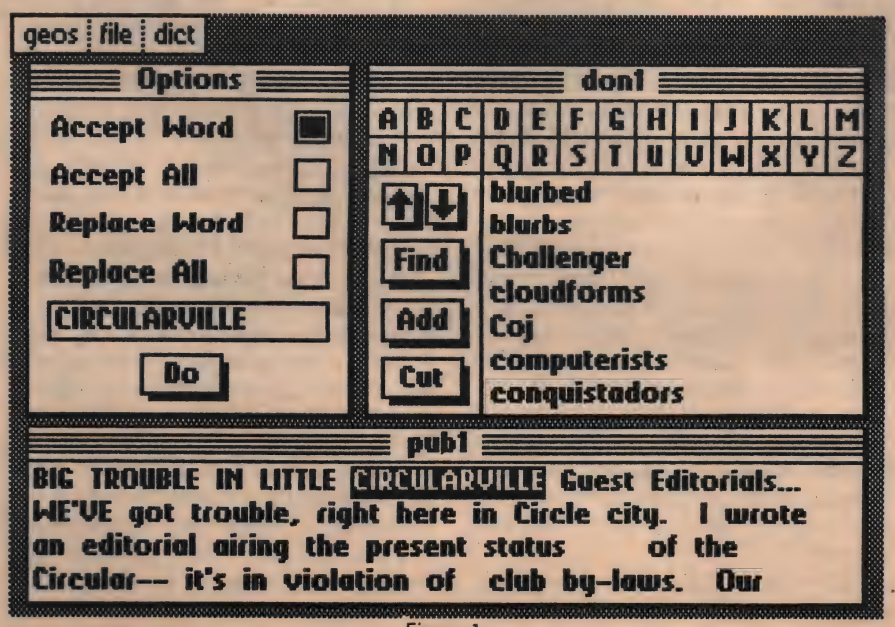

Figure 1

TIMEX-SINCLAIR

Sinclair Survival Column

by Mark L. Fendrick

When the QL first appeared, a few books were written in England on its use. These books, available in this country for a while, were written based upon UK ROM versions. For the most part this was no problem, but there were a few points (such as display data) which did not hold true for a JSU (American) ROM QL.

Now a book has been written in the U.S. by Dr. Michael A. de Sosa and published by the Time Designs Magazine Company (29722 Hult Road, Colton, Oregon 97017). With new QLs still available for sale (and being sold) this book, *Taking The Quantum Leap*, becomes a sought after commodity. The book is written to be a supplement to the QL Users Guide, going into much more detail on many topics. It is written with both the experienced computer user as well as the novice, and may be used in place of the QL Users Guide by those who find that book too vague and/or complicated.

Whether you are the type of computer user who just wants to use your software with no knowledge of programming, or one of the many who want to maximize your computer's value through programming in Sinclair SuperBASIC, you have been kept in mind by Mr. de Sosa.

Taking The Quantum Leap is divided into 14 chapters which show you how to use your QL hardware and the suite of four sophisticated programs which come with the full QL package. (Those of you who have bought the kit might not have the Psion software, but then again you probably do not have the Users Guide either.)

Chapter 1 (Introducing the "Quantum Leap") is a first look at this, the last computer to be produced by Sinclair Research. This chapter covers the physical aspects of the computer, and is illustrated with photographs of the American version QL. The American names of the bundled software are related to their British counterparts and the original (British) names are used in the rest of the book's text. Specifications of the U.S. version are also included in this chapter.

Also in this chapter is a brief discussion of the 32 bit/8 bit controversy about the QL. As you know, the QL uses a Motorola 68008 CPU chip, which utilizes a 32 bit architecture, but only has an 8 bit communications bus. The author explains that the 32 bit CPU allows the QL to handle more complex operations while making the operation of the computer easier for the user.

Chapter 2 (What to do until the QL comes) gives the new QL user—who has ordered his computer but not yet received it—some things to think about in the interval until the QL's arrival.

continued on page 236

TANDY

The CoCo Column

Written by Dan Robins

It's not a disease in the classic sense, but once the "modem bug" gets you, it's hard to shake off. It is, after all, quite a bit of fun! In this month's article, a look at the technical and not-so-technical end of the CoCo and telecommunicating. Also a review of an alternative in desktop publishing and letters from *Computer Shopper* readers.

CoCo And Communications

The "bit-banger" is one of the most commonly used terms associated with the Color Computer, as it refers to the serial port in the back of the computer's case. Ever wonder why they call it that? Essentially, because the serial port either exports/imports data to/from other devices one bit at a time. At the point the bit-banger processes eight bits of information it then continues to the next BYTE (eight bits = one byte).

The CoCo's serial port is utilized for more than one purpose. In many homes, it is connected to a serial printer, like the DMP-105. If you are lacking a Tandy RS-232 cartridge, it's quite handy for data communications through a modem. Because the P.I.A. has to constantly switch between accepting input and sending output to the modem, your baud rate using this method is limited to 300 baud. Before anyone disagrees, the CoCo 3 and it's reliable high speed mode, do allow for communications through the serial port at 1200 baud.

There are two Peripheral Interface Adapters used in the CoCo. One (known as PIA-U8) is mainly for reading the keyboard matrix. The other (known as PIA-U4) is for several different functions. These functions include digital to analog conversion (changing bits/bytes into actual sound waves), activating your cassette's motor relay switch, controlling graphic modes, and sending information out of and into the computer through the serial port.

The job that PIA-U4 must do is selected through the use of "registers". These registers are located at memory locations (hexadecimal) $FF20, $FF21, $FF22, and $FF23. In general, $FF20 and $FF22, commonly known as the I/O registers, contain the data received from or to be sent to the modem. Registers $FF21 and $FF23 are referred to as the control registers. The use of these will determine what direction the information is going. It also allows you to switch between using the other two registers ($FF20 and $FF22) as places to store data OR setting the direction of the data.

Additionally, you can use these four registers to determine if your modem has detected carrier from another modem, enable the sound generator, and even detect and give control of the computer to a ROM cartridge.

Public domain programs like MikeyTerm and Greg-E-Term, as well as several commercial offerings, support modem communications through the "bit-banger" serial port. All support transmission rates of 300 baud, and Greg-E-Term will support 1200 baud with the use of the Color Computer 3. If you wish to obtain a higher baud rate, seriously consider the purchase of an RS-232 cartridge. I should mention though that Tandy has dropped the production of the RS-232 pack and they may be hard to find. One alternative to the RS-232 pack is the Direct Connect Modem. While limited to only 300 baud, Mike Ward (the author of MikeyTerm) recently developed a patch to the program which offers compatibility with the Direct Connect Modem. This patch can be found on most of the national electronic forums.

In next month's CoCo Column, we'll finish our inside look of the Color Computer, with details of the VDG (Video Display Generator) and the different display modes.

Reviews And News

Recently I reviewed Tandy's Home Publisher, the OS9 Level 2 desktop publishing program, but when Bob Rosen of Spectrum Projects (P.O. Box 264, Howard Beach, N.Y. 11414) sent me NEWSPAPER, an RS-DOS desktop publishing program, I wondered how different it would be from it's OS9 counterpart. It is different, and it's graphic's abilities are equal to and faster than Home Publisher.

As you begin, you must customize the program for your system using a configuration program. Specifically for the Color Computer 3 with disk, you select your type of monitor (RGB or CMP), Disk Basic (1.0 or 1.1), the system/data default drives, and your type of printer. Compatible printers with Newspaper include any Epson, several DMP models, the CGP-220 color graphics printer, and even the Laser LP100. After completing this setup, a configuration files is written to disk for future use.

There are four main sections selectable with Newspaper. The Type-Up Graphic Editor, the Layout Program, a Print/View section, and the Picture and Font utilities. Although this program does not interface with the Color Mouse and does require mostly keyboard interaction, you will not experience the lengthy redraw sequences of Home Publisher.

While in the Type-Up Graphic Editor section of the program your options include a picture stamp, clearing the screen, UNDOing a previous action, pencil, grab picture, and the disk menu. The grab picture function allows you to import a previously saved graphic, including those produced by ColorMax 3. Pencil provides drawing functions, such as lines, boxes, circles, dots, fill, erase, invert, and text modes. The Disk menu gives options of loading or saving a font set, pattern set, graphics panel, or a separate piece of art. The object of the program is to design and draw your newspaper in one of several blocks. Later, each block is imported and placed for the final product. I became quite discouraged that I could not return to the Main Menu after completing my work in the Type-Up Graphic Editor. Either you do not have the ability or the process of returning is omitted from the documentation. In my particular case I had to reset the computer to return to the Main Menu.

The Layout portion of the program prompts you to select the way you want to set up Newspaper. You have three selections. The first is a page with 7 blocks. The uppermost block is stretched horizontally to give you a headline effect, and the remaining six blocks are layed out in a two column fashion. Selection 2 has two columns with four blocks in each column. The final selection is like the second, except there is no white space between the columns at the top. I should mention that when you save the Layout configuration, use the default extension. I gave it another extension and found myself unable to retrieve it in later use.

The third selection from the main menu is the View/Print package. By selecting this option you may view the entire contents of your newspaper or print it. A printing option allows for either a draft copy or final copy of the newspaper. The final copy will print a much darker version than the draft copy if the printer allows it.

Finally, the Font and Picture utilities give you the ability to edit or create different fonts or patterns used in the creation of the newspaper.

Other than a few omissions in the documentation and the ability to return to the Main Menu from the "Type-Up" section, I found Newspaper to be quite a functional program. I am pleased with it's performance and it's speed is quite fast. The program sells for $49.95, which may be a bit steep and puts the product out of reach for some customers. However, it is a good alternative for those who care not to mess around in the OS9 environment of Home Publisher.

I also received two programs from a High Point, North Carolina company, A TO Z Unlimited, written by David Ostler. The first program, BTU Analysis, offers the user the opportunity to analyze the heating requirements for a home or business. This program took more than three years to complete and through the process of answering questions will figure the amount of BTU's (British Thermal Units) necessary to heat an apartment, home, office, or plant. It's printing utility of the resulting information is formatted in a very professional manner. This gives an HVAC (Heating, Ventilation, & Air Condition-

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TEXAS INSTRUMENTS

TI Forum

by Ron Albright and Jonathan Zittrain

I bought my first TI-99/4A console at the J.C. Penney Department Store, along with a few cartridges (then called "command modules"). I paid about $225. That was in August of 1982, aeons ago for the TI-99/4A community if not the whole computer industry.

The price of a TI-99/4A console has certainly changed since then, dropping to as low as $25, depending on what fire sale one might be attending. And that's a more significant difference—one is now far more likely to find a TI-99/4A at a fire sale than at a J.C. Penney's.

The TI dealer and distribution network has swung from one extreme to the other since the time the home computer was originally released. Prime time television advertising with Bill Cosby promoting the machine has given way to the classifieds in *Computer Shopper*. A solid, consistent set of software, tightly controlled and released by Texas Instruments, is now an incredibly colorful collection of programs ranging from the totally useless to the awe-inspiring, from myriad authors and sources.

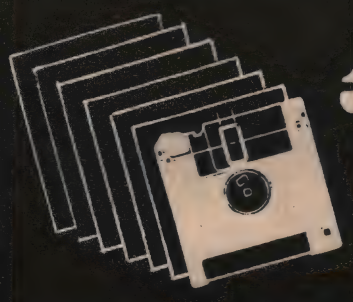
Where is the TI dealer network today? How is it that the TI-99/4A has had its best and brightest years only after Texas Instruments threw in the towel and gave up its multi-million dollar investment in the machine and its market? How much longer can this last?

Not only are these questions interesting, but they are important to ask if the TI community is to be able to set its own course in the future.

With most computers, the core of the brand's success and proliferation is at the local dealership level. Consumers can call their local computer store for help on using their computers, and stop in and browse the latest products. With the TI distribution chain originally going through department stores and other large, diversified dealers, there was never that element of being able to rely upon the dealer for help using the computer. There were, however, plenty of chances to browse and buy. Today that is gone as well—in fact, most people who do not currently own a 99/4A are probably completely unaware of its existence. Yet that still leaves approximately one million 99/4A owners who did purchase their computers before TI pulled out in "Black October" of 1983.

There had been a few local TI stores, owned and operated by Texas In-

continued on page 238



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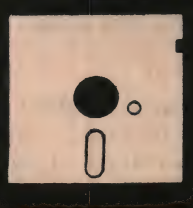

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ATARI

Applying The Atari

by Jeff Brenner

After a delay of ten months, DataSoft/Intellicreations has finally completed the 8-bit Atari version of Video Title Shop, and Electronic Arts (the distributor) has begun filling dealer back orders as of this writing. Originally, the product was to be marketed along with a Graphics Companion program, which contains graphics for use with the Video Title Shop. The Graphics Companion program was to retail for $19.95. Instead, the Graphics Companion is now included within the $29.95 Video Title Shop package as a bonus (or, perhaps as a token reward for ten months of patience). A Graphics Companion II diskette is offered separately by Electronic Arts for $19.95.

From No Frills Software (800 E. 23rd St., Kearney, NE 68847, 308-234-6250) comes several new graphics diskettes for PrintShop users. The icons and fonts are by various designers and are attractively designed. Ed Kielbasinski of No Frills Software writes, "The 8-bit products include the first upper/lower case font commercially available for PrintShop on Fonts & Borders (disk) #3, and nine new upper/lower case versions of fonts on our first three disks on Fonts & Borders #4. In addition, disk 4 has two specialty fonts. The first font is a font of Morse code, including letters, numbers, and commonly used phrases. The second is a font version of the American Sign Language Manual Alphabet (including the letters for nonsigners). Disks 3 and 4 also contain borders for PS Companion users. A second Christian Scenes disk has been converted for the 8-bit line for Atari of materials originally made by Donaldson's Graphics of Pittsburgh, PA. Also released are PS Graphics 2, 3, 4 and Budget Graphics 4 through 8. In addition, we have acquired the rights to the N.E.R.D.S. map disks and a disk of Coats of Arms (with material to make your own coat). The latter consists of Coats of 170 common names plus 60 + pieces of art to make your own coat by using the superimpose function on PS Companion." All of the images are reproduced in a catalog available from the company.

The new Six-Systems Box, from Irata Verlag, which allows for the convenient switching of operating systems will be reviewed in this section next month.

Reader Mail

Cal Degroot's question on the RAMcharger in the January 1988 issue, and Marvin J. Bleiberg's March 1988 response have continued to generate interest in the subject of CP/M and the 8-bit Atari. Some informative letters follow.

Dear Jeff:

There seems to be several misconceptions commonly floating about in regards to CP/M. While I've not had direct experience with the RAMcharger, I think I can help with this also.

There is only one (as long as we are using Ver. 2.x) "dialect" of CP/M. The misconception here comes because there are some machine specific parameters introduced by various computer manufacturers. These for the most part are easily remedied. The problems include:

1) Disk formatting. There was never (to this day) any standard 5.25" disk format (as there is with the 8" SSSD). Nearly all computer families have different disk formats. This problem can normally be solved by using one of the many "compatibility" programs now available. In the case of downloading from a BBS, this doesn't present a problem because the data is not being transferred by disk, but over the "line."

2) Terminal emulation. While it's true that there are several dozen different terminal types, one has become the "defacto" standard in CP/M. That being ADM3A. Machines such as Kaypro, Osborne, ATR 8000 (when used with the Atari keyboard in terminal mode), etc. all use this term emulation. I strongly suspect that the RAMcharger does too. This is most likely the ATR 8000 compatibility that Future Systems claims. This emulation allows certain (not all) programs to use cursor controls and other screen functions. Most public domain programs are generic; that is they are specifically designed to be able to be used with any terminal. Most public domain programs that are term specific are for the ADM3A emulation. Most purchased programs have to be installed for your specific terminal. Many do not, including Ashton-Tate's Super dBase II.

I suspect that Mr. Bleiberg's "bug" in WordStar is due to an improper installation of the printer he is using. I would also suggest that anyone using CP/M with the Atari purchase a good monochrome monitor (make sure it has composite inputs). Life is a whole lot easier in 80 columns!

I own numerous CP/M and MP/M based computers (including four ATR 8000s). I also own PC clones, Unix, Xenix and of course my beloved Atari's. It's the CP/M machines I turn to for everyday work. I cannot find any advantages to any other system. Incidentally, the CP/M boards and UGs are still very much alive. If any of your readers have specific problems, I'm including my address.

Phil Peck
Bonita, California

Many thanks for the interesting CP/M information and your offer of assistance. Readers interested in contacting Mr. Peck can write him at P.O. Box 1191, Bonita, CA 92002.

Dear Jeff:

I just read the latest article in *Computer Shopper* regarding CP/M, the ATR 8000 and Atari 1050 drive with Happy Version 7.1. I have just recently acquired an ATR 8000 and finally located the manufacturer in Ft. Worth, Texas, where I purchased the hard drive interface so I could use a 20 meg. drive. After purchasing the required hard drive (Seagate ST-225) and the Western Digital controller board (WD1002-05) I was finally able to put together what I thought was a complete system. The hard drive modification for the ATR 8000 also included software so that I could format and configure the hard drive so that the Atari would recognize it just as if it were an actual Atari peripheral. But unfortunately, I have been having some problems in steps of the procedure following the FORMAT. The "WINCH" file I am to load from the floppy is supposed to create the actual hard drive recognition, but all I keep getting is "cannot load driver." SWP, the manufacturer, has sent another disk, but it does the same thing. If you know anyone who has had experience with this ATR 8000 and the hard drive, please pass this on.

As far as CP/M and the ATR 8000, it can format a floppy in four different modes, including single or double density, and single or double sided, depending on how you configure its drives with CP/M. The Happy modified 1050 drive using Version 7.1 software is capable of displaying text files only that were originally written on an IBM using MSDOS in the low density single sided mode. Included in the software is a utility that will change the carriage returns to and from Atari and IBM codes. (You must use DD disks, not HD disks.)

Keep up the excellent column in *Computer Shopper*.

Kenneth Rogers
Melrose, Massachusetts

Gruss Gott, Jeff:

(That's about all the Deutsch I can muster.) I'm writing from Bavaria, West Germany. We get *Computer Shopper* here about a month late, but I'm grateful to get it at all!

In the February 1988 issue, Paul Strutz wrote that he can't get 5200 game ROMs to work in his 800XL. I would assume these are the ROMs advertised by Lolir in *Computer Shopper* as I ordered some also. However, I exam-

continued on page 240

ADAM

Secrets Of The Adam

by G. A. Smith

Adam owners, lift up your heads and dust off that computer, it is time for Adam users to see some of the things the Adam computer will do other than a letter quality word processor. Here is the information about your computer that you have been waiting to get your hands on!

Let's skip the introduction about how to set up your Adam and telling you about what equipment you have with the system. All of that is in the manuals you received with the computer. You have been alone in left field long enough. Let's get down to business with the Adam!

BASIC...BASIC...BASIC

Have you been playing a BASIC game on Adam, and noticed that each time you play it, it "acts" the same way every time? Your simulation or game isn't quite so random! Type in and run the following example:

```
10 FOR I%=1 TO 9: A=RND(0): PRINT A,: NEXT I%
```

Write down the numbers. Now, run the program again and compare the same numbers.

The same, huh? This is due to the fact that the random number generator on Adam starts at the same place every time you run a program. If you want to get it to start at a different place, then add the following lines to your program.

```
1 CLS: PRINT "Press any key to go."
2 A=RND(0): A$=INKEY$: IF A$="" THEN 2
```

Add the above lines to the "program" you just typed in. Run it several times. When the program starts, it will give you the message "Press any key to go.", then wait for a key to be pressed. Nobody can press a key at the same microsecond every time! The results should be different each time you run it. So you now have an effective random seeded generator for your games and simulations.

The variables A, A$, and I% can be used in the program somewhere else as their work is done and their values need not be preserved.

A graphics demo program for your Adam. Build on these principals to make your Adam do your graphic work! (Look at the program's lines 1 and 2. Remember them?)

```
1 CLS: PRINT "Press any key to go."
2A=RND(0): A$=INKEY$: IF A$="" THEN 2
100 HGR: A=INT(RND(0)*15+1): IF A=0 OR A=4 THEN A=A+1
110 HCOLOR=A: Y=80: X=13
120 FOR I=1 TO 50: FOR R=0 TO (2*3.141592654) STEP 1/I:
NX=X+COS(R)*I: NY=Y+SIN (R)*I
130 IF NX<0 OR NX>255 THEN 170
140 IF NY<0 OR NY>156 THEN 170
150 HPLOT NX,NY
160 NEXT R
170 X=X+3: NEXT I
```

During execution of your BASIC games, does your Adam seem to hesitate

continued on page 252

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COMMODORE

GeoSynch continued from page 229

Glad you asked. GeoSpell's main screen is divided into three sections—Document Box, Options Box, and Dictionary Box. Of the three, only Document Box bears a passing resemblence to geoSpell's text-based counterparts.

Document Box: displays, like the others, a screen of text with the first questionable word highlighted. GeoSpell shows only four lines of text in the Document Box at the screen's bottom, along with the tagged word highlighted in reverse-video.

True, you don't see a whole page of text, but do you need it to check spelling? Just viewing the questionable word in context tells you if it's the right word. If you feel you've misspelled the word, look it up in Webster's, or in geoDictionary (see Dictionary Box).

Options Box: a quick cursor to the Options Box yields multiple choices to deal with the offending word. "Accept Word" (the default setting), "Accept All" (global acceptance of the word), "Replace Word," "Replace All" (global search and replace), "Current Word Field" (where suspect words are displayed for editing), and "Do" (performs the option selected).

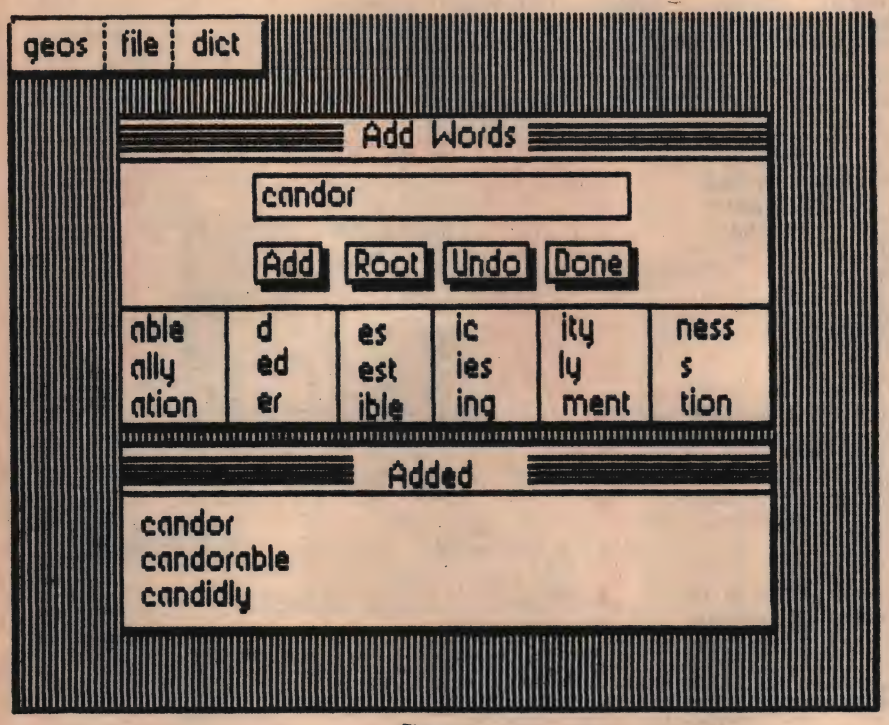

Figure 2

Test of Bitshift, Dual-print, & standard Gemini 10-X drivers. Std. BSW driver
Test of Bitshift, Dual-print, & standard Gemini 10-X drivers. Dualshift driver...
Test of Bitshift, Dual-print, & standard Gemini 10-X drivers. & Bitshift driver...

Figure 3

Once sure of the spelling, a mouse click opens the Current Word Field. After correction, click first "Replace Word" and then "Do"; it's that easy. If you are unsure about the word and neither Dictionary lists it, proceed to the Dictionary Box.

Here, a click "Find"-s the seven nearest spellings. Odds are if the mistake is at the end of the word, you'll find the proper version in the Dictionary Box.

Life is rarely this simple. If you're almost sure of the spelling, click and enter your guess in the Word Field Box, then click Find in the Dictionary Box—or hit Return—and GeoSpell confirms the guess.

If you're alphabetically close, Dictionary's Scrolling Arrows can help you find the right spelling. Click on the replacement, and the Word Field box shows the new word while the command default shifts to Replace Word. Click Do, and you're done. Nice!

Finally, if Personal Dictionary or geoDictionary can't find a word, confirm with Webster's, click on the Word Field, make the revision, click on Replace Word, and then Do. As long as you've created or opened a Personal Dictionary, you can opt to add a new word to it.

Rooting For You!

BSW hid geoSpell's real power in "Add" within the Dictionary Box. Enter your first word in a Personal Dictionary with a click on Add, and geoSpell opens a Dialog Box called "Add Root." Now, you see three choices: "Only" adds just the root word displayed in the "Current Word Field Box"; "Vars" adds both Root and Variations; and "Done" returns you to the main geoSpell screen without changes.

Only and Done are self-explanatory. Vars (short for "Variations"), however, is spell-casting magic of the highest level. Click on Vars, and an "Add Words" screen (Figure 2) shows the word, and suffixes you may wish to use. If you add an improper suffix and exit, don't worry; user-added words can be deleted any time the Personal Dictionary is in memory (select "dict" on the Command Menu to switch from geoDictionary).

Documentation

What can I say about geoSpell's 14-page manual? Concise and complete, yet comprehensive. But for one minor typo, it's a gem.

Conclusion

GeoSpell's design is simple and straightforward. Though bound to a GEOS 64 Kernal, it flawlessly checked geoPublish-updated files and GEOS 128-generated text (both 2.1 versions). Despite all efforts, the properly installed program never crashed! In the bullet-proof department I rate geoSpell a 10.

An improperly installed geoSpell, on the other hand, freezes the system. As a test, I didn't validate the geoSpell Master disk after installing it. As a result, geoDictionary grew an extra 1K byte and locked the system on words that began with "Z."

Fortunately, this is user-repairable: validate the Master and replace the invalid geoDictionary with the valid one.

So much for the good. Although it's true of most spell-checkers, geoSpell is slow—slower than EasySpell or PaperClip Speller on same-size files. Also, g'Spell lacks a "real" word-count, average word length, words per sentence, and most of the other document analysis features found in many text-based spellware. Single drive owners, watch heat buildup, and consider one big-budget purchase. For sanity's sake, get some high-speed mass storage, preferably a RAM Expander! For 128 geoPhiles, the 1750 or 1581 drive will pump up your geoMuscles.

Despite the speed limit, I feel the Root Word/Add Words feature more than compensates. GeoSpell feels as though Berksoft built it on bedrock. Speed is the final factor in the ratings below.

Overall rating: w/single drive, 9.0; w/two drives, 9.5 (w/1541-71 & 1581, 9.75); w/REU. 9.9 out of a possible ten.

Gee...No, geoFont!

Describing GEOS applications takes more effort than implementing them! This isn't true of geoFont. It's at once easy to describe, use, and a joy to talk about. I couldn't crash the thing, and believe me, I tried!

A little history: geoFont is the first application marketed by Berksoft that doesn't hail from their workbenches. Created by independent designer Arthur J. Dahm, Berkeley execs thought well enough of geoFont to purchase the rights to sell it. I will say this: if you want more fonts than Berksoft offers—or modify existing ones—get this program.

A few months back, I hinted at a possible shoot-out between the FONT Editor from Abacus's book, *GEOS Tricks & Tips*, and geoFont. I can't bring myself to do it; you don't send an unarmed man against a hired professional killer. FONT Edit is a gawky youth, fun to be with maybe, but it's still only a desk accessory. GeoFont, a full-bore GEOS-shell program with more deft moves than the Redskins' first string, is the real thing—worlds apart in basic structure and design philosophy. Comparing these programs wouldn't be Cricket.

GeoFont's main screen controls the entire creative process. Every selection you make, every change you invoke, is done with joy/mouse. Effortless.

While geoFont seems bug free, the manual isn't—proving (and this is a first) that document smiths can actually write too concise. Instructions on character placement within the Edit Screen's work area are vague, as are directions for modifying existing BSW fonts. As a result, my initial font creations were a mess. After playing a bit, the going became much easier. With a little experimenting, great Fonts are yours for the making!

Printer Driver Magic!

Many of us own third party printers that have the potential of greater print definition than GEOS gives. Star printers use a variation of the Epson drivers. Have you ever wanted darker,

continued on page 236

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MICRO

TIMEX/SINCLAIR

Sinclair Survival continued from page 229

(Sort of a Dr. Spock for the expectant QL owner.)

This chapter starts out with a discussion of compatible printers and monitors. It recognizes that although the branded Sinclair QL Vision monitor and QL Printer are highly recommended, they may be nearly impossible to obtain. Therefore a number of other brands of monitors and printers are listed which have been tried and found to be compatible with the QL. This chapter offers the very valuable advice—plan ahead. Now is the time to determine what you will be wanting to do with your QL, and based upon those decisions you will know what accessories you will have to order from your QL dealer. A perfect example of this is something as simple as a RS232 cable or RGB monitor cable. Taken from personal experience, I can tell you that there are few things more frustrating than to go out and buy something for your computer (such as an RGB monitor or a modem) and then have to wait additional time while the appropriate connection is ordered before you can use it!

Then there are the "generic" type of accessories which you might want to consider purchasing so they may be on hand upon your computer's arrival. This category includes such classics as a multi-socketed extension cord, surge protector and other goodies which you might find useful.

How about your new computer's place in your house? Have you thought it out or will it take up the dinner table until your family finally gets hungry? A number of methods of setting up your new system are suggested.

The final bit of preparation that the author recommends is the book itself. (But if you are reading his suggestion then you already have the book don't you?) Actually it is not the purchase of the book being recommended here, but the good advice to read the book so that when your QL actually arrives you will be familiar enough to get it set up and start to get some hands on experience right away.

Chapter 3 (What to do when your QL comes) guides you in that set up when you actually have your system in front of you. One of the potentially most useful sections is the setting up of your monitor. This may sound very easy, and would be if you had the hard wired QL Vision RGB monitor, or are using a TV. Most people, however, use the QL with either a monochrome monitor, composite color monitor or an RGB monitor. This might take some preparation, and this is covered here. The proper pins are identified and a discussion of interfacing is included.

Once set up, you are given a discussion of what should happen if it is properly connected and working as it should. If everything is not exactly as it should be, some suggestions are made as how to correct the problems.

Getting started with one of the included software packages is the next step, and the suggestion that you make backup (working) copies of this software is incorporated in this dicussion. The step-by-step instructions on how to do this include formatting a cartridge and running the clone program. Those of you who have been reading this column since the first look at the QL will remember that it took me quite a while before I found the two sentences on how to format a cartridge.

Chapter 4 (Tickling the ergonomic, two-shot molded, 65 key, QWERTY keyboard) not only discusses the setup of the keyboard, and what to do with some of the individual keys, but some very important commands (which I spent hours searching out in the users guide) to get you going with your new computer. The Function keys are identified and some of their uses discussed. The CTRL and ALT keys are located and how they can be put to work follow. A look at some SuperBASIC keywords which can be useful (DAY$, DATE$, DELETE, DIR, FORMAT, INK, LOAD, LRUN, MODE, NEW, PAPER, PI, PRINT, RUN, SAVE, SDATE) even if you are not going to be programming is next. You will find such helpful information as the various display modes on the QL and immediate commands useful on your computer.

Chapter 5 goes into a discussion of the QL itself. In the way of digression, a short history of computers is presented which ends with the historic introduction of the Quantum Leap as the first lightweight, low cost supercomputer. It gives a number of uses for the QL in situations other than those in which it is running companion software. Although a bit pricey to be used strictly as a calculator, the QL does in fact make a Supercalculator in combination with SuperBASIC. A detailed discussion of a mathematical nature is pursued in this chapter.

Chapter 6 looks at the operating system developed for the QL, QDOS. Since the QL was designed to be quite revolutionary in its design, a new operating system was required which could handle the built in microdrives, multi-tasking, and leave room for additional add-ons and expansion. This chapter looks at that operating system, and the Sinclair microdrives are probably the weakest part of the QL system, some helpful hints on using the drives, handling the cartridges and prolonging the life of the drives.

Chapters 7 through 12 concern themselves with the four Psion programs which come bundled with a complete QL package. Unlike the brief descriptions in the QL Users Guide (they can't really be described as manuals), the programs are described in some depth in this book.

One of the first characteristics of these programs which was headlined was the fact that they are fully integrated, sharing a similar look, feel and file format. The first of these chapters is a much needed overview of the programs as a package. Common characteristics of the programs, such as how to access HELP and how the screens are set up are pointed out. Once again the procedure for formatting a new cartridge for making a working copy, and using the clone program to make copies are described. The steps needed to start each of the programs is discussed, a discourse I could have used upon setting up my QL.

The keys which are the same in each program are explained as is the proper way to setup the screen display for your particular setup. The method of storing and retrieving data is explained and some suggestions on properly naming files are given.

Also in this chapter is a simple look at the QL/printer connection, a discussion sorely missing from the QL Users Guide. The drivers, which must be customized by way of the INSTALL_BAS program (not included on all of the program cartridges—a fact never mentioned in the QL Users Guide at all), have been a point which has confounded many new QL users.

The use of the CONFIG_BAS program is also discussed. This is important if you are planning on using (or adding) alternative storage devices such as a floppy, or even RAMDISK storage. Even the proper method of ending your session with each program is looked at, hopefully preventing someone from simply powering down with file(s) still open.

Chapters 8, 9, 10 and 11 are the much needed users manual for each of the four QL software programs. In each case a clear explanation is given of each of the programs features with illustrations (both by written word and by drawings and photos) of how each is utilized. These chapters alone are worth the price of the book ($25.00) for those who want to make the best possible use of these programs but are confused by the explanations in the QL Users Guide.

As good as these four chapters are, Chapter 12 is unique among all of the supplemental books I have seen regarding the Psion programs. Entitled Optimizing QL Software, this chapter gives some tips which the author, and others, have accumulated while actually using these programs. Integrating your data is confused in the Sinclair Users Guide, but Mr. de Sosa goes a long way in demystifying this topic. Using more than one QL in a network (flaunted in the QL advertising, but barely touched upon in any of the Sinclair or third party documentation) is explained in length. Since this book is not published by Sinclair or any of the third party software publishers, packages other than the Psion group are mentioned where and when they will help the QL user to maximize the benefits to be gained by using a QL.

Chapter 13 is a look at SuperBASIC, a superset of the familiar Sinclair BASIC. Missing, however, are the single stroke keywords, but not at a loss of power. SuperBASIC has many of the features of some of the more popular programming languages, making it a very versatile language for both the novice and the experienced programmer. In addition to the description of the language, this chapter contains the obligatory "free" SuperBASIC programs. In the case of this book, there is even a program by one of the best (and best known) American Sinclair programmers, Thomas B. (Pro-file) Woods.

The final chapter looks at some new developments for the QL as well as some of the other capabilities (such as multi-tasking) of the computer. A few of the classic software programs are mentioned in these discussions. Interfacing a floppy drive gets its place here

continued on page 241

COMMODORE

GeoSynch continued from page 234

line-free page graphics, print features to fill in dotty-matrix lines, or truly solid lettering? Thanks to a few gifted programmers, some of us now can!

These hackers revised BSWs original drivers (or wrote new ones) to improve the final printed page by employing double-pass and bit-shift techniques with great results.

What's the catch? Well, these drivers print each line of graphics (and text) twice, effectively doubling an already lengthy printing time. The final choice—quality versus time—is up to you.

The drivers are available for downloading on QuantumLink. To find them, enter the GEOS ARENA (a "Plus" service) in the Commodore Software Showcase, and select Applications (you'll also want to download a sequential-to-GEOS converter if it's not on your Q-Link disk). You'll find drivers for Star Gemini 10-X, Star NX-10 (not NX-10C), and a lot more. The 10-X drivers produce pleasing results (Figure 3, page 234). If you aren't a Q-Linker, try your local Commodore user group. Q-Link may provide the driver you need.

Looking Ahead

I wanted to cover Laser Direct, but it's not in the cards right now. Maybe in a column or two. Next, time, I'll run through the 128 Version of geoWrite Workshop, with a quick tutorial on the new Paint OVERLAY and Paint PAGES "geoPaint" drivers included in this upgrade of Writer's Workshop. Space permitting, I'll answer a few letters.

Questions, comments, and letters to: this magazine, or to me, at 7331 Hearthstone Way, Indianapolis, IN 46227. On Q-Link, Q-mail to "Geodeamon" will reach me.

Till next time, "Reach for the stars!"

At a suggested price of $29.95, the geoSpell package with geoFont is available from Berkeley Softworks, 2150 Shattuck Avenue, Berkeley, CA 94704; (415) 644-0890. ●

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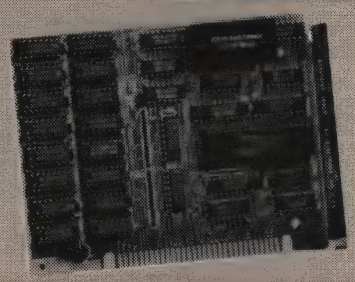

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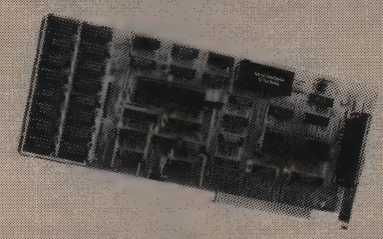

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TEXAS INSTRUMENTS

TI Forum continued from page 230

struments before the pullout. These, and the large department stores, were gradually replaced by small local dealers, who often offered only TI products.

Chuck Percherke, owner of the Computer Bug in Pittsburgh, Pennsylvania (412/882-3374), was one such dealer. He opened shop on October 1, 1983, only to find TI pull out of the market on October 29. "I thought it would be a complete disaster," said Percherke. "Instead, it was a blessing. Because of TI's withdrawal my major competition was eliminated—the discount houses like K-Mart and Service Merchandise."

According to Percherke, he shipped as far west as Oklahoma, and regularly had customers from New York and Ohio. "When I first opened, I had everything," said Percherke. "I offered almost every TI program that was ever made."

William Nitka, owner of Nitka Computer Software in Sinking Springs, Pennsylvania (215/670-0800), tells a similar story. "We were sending computers out to California," said Nitka. Percherke and Nitka characterized their customers as usually owning only a console, often visiting their stores for the first time. Hence disk-based software, the kind that most third party software manufacturers produce, was and is not as much in demand. "There's only so many disk systems," Percherke said. "There's a tremendous amount more that just have the consoles."

This, combined with the ease with which disk programs could be copied illegally, eventually contributed to his decision to offer only cartridges to his customers. "I used to have a lot of third party software available on disk," said Percherke. "To watch it sit on the shelf month after month was too frustrating." According to Percherke, program piracy had a major impact on the amount of interest in buying disk software. "If you get one out there, within a short time everybody's going to have it."

Nitka was surprised to find that his customers often obtained illegal copies of software even before he could get the software on the shelf in his store. Other dealers, while careful to acknowledge users groups as a major source of business, point to users groups as great opportunities for programs to spread, copyrighted or otherwise.

"I'd steered away from third party material because, frankly, a lot of it was really junk," added Nitka. "The only good third-party programs are the cartridge-based games." Percherke and Nitka both cited gaming and educational software as their top sellers. With the advent of newer and cheaper video game systems such as Nintendo's, however, interest in the game cartridges for the 99 is waning a bit more, said Percherke.

The few years following 1983 thus saw the peak and decline of the local TI dealerships. With the value of the unsupported 99/4A going down and new computers being released, TI consumers became less interested in sinking more money into their 99/4A systems. It is now difficult to find any small local dealer that stocks any TI hardware or peripherals, or that would be all that willing to order one in. "There's too much used equipment out there now," Nitka said. "Why would anyone order new when they could ac-

continued on page 240

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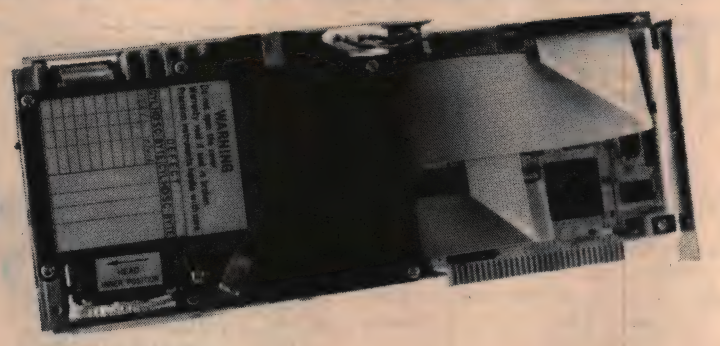

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TANDY

CoCo Column continued from page 230

ing) specialist quite an impressive spec sheet to offer a prospective client. The program has an encryption-type copy protection. Through the use of a basic-to-machine language process it will show several ?SN syntax error messages, but goes on it's way without any real error. Having dealt with several companies in the past that would find this type program useful it's $27 price tag is a steal!

A TO Z's Chemistry Tutor was also impressive. It comes packaged in a two disk set and presents an impressive study of high school or early college chemistry. Using a mixture of the CoCo's 32 column screen and PMODE 4 graphics, you'll be taught chemistry principles and theories. I was also impressed with the testing section which quizzes you on what the Tutor has presented. The $42 price tag may be a bit on the high end for some, but attendance at a community college to learn the same material would definitely cost more.

For more information on these two A TO Z Unlimited products, send inquiries to their Software Division, 901 Ferndale Blvd., High Point, N.C., 27260.

Letters From Readers

Q. From Don Northcutt of Wichita Falls, Texas:

In the CoCo Column in the March 1988 issue, the answer provided for Richard Davis' question about upgrading his CoCo 2 skipped over the disk controller issue. Most of the CoCo 1 disk controllers require 12 volts on "land 2"of the cartridge port. The CoCo 2 and 3 do not have this present because only 5 volts DC is used internally. However, an adequate unregulated voltage (approximately 10 volts) is available at one of the large diodes near the power supply.

A. You're absolutely right! As a matter of fact, I fell into that category of the unknown! My first disk controller was one of those, and I quickly found out that without the voltage present every disk command ended with an I/O error. Although 12 volts can be tapped in and around the CoCo circuitry, the safest bet is to provide the controller with the necessary voltage with the use of a separate power supply unit.

Q. From Dallas Jensen of Coleridge, Nebraska:

Back when the CoCo 2 first came out, I bought one for my daughter who lives in Virginia. At first she just used cartridges and the tape programs. I then ordered a set of double sided half height disk drives and controller from J&M systems with JDOS. I sent her some disk programs but she has never been able to get any of them to run. The computer and drives have been checked out and are okay. Could you make some recommendations as to what I should do to make this a usable system? Is a color monitor and video driver worth the cost and will it work on the CoCo2. Should I get the Tandy drives and RS-DOS?

A. The problems with having a non-RSDOS disk controller are those of incompatibility. Some software manufacturers include routines that check what DOS you are using and make changes accordingly. Some don't! No need to take drastic measures. My suggestion would be to obtain a Radio Shack Disk Basic chip and plug it into the appropriate chip socket. Although there are other alternatives, since this involves both of you in different states, it is probably the easiest route. No need to get new drives though. A video driver and color monitor will come in handy if the computer is heavily used for projects like word processing or office work. If your daughter is unhappy with the RF modulator-to-TV hookup which is standard with the computer, then by all means purchase the driver. ●

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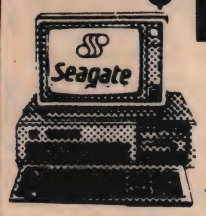

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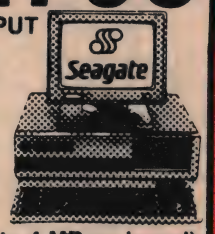

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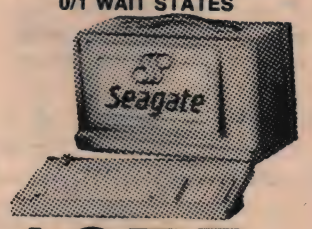

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TEXAS INSTRUMENTS

TI Forum continued from page 238

tually buy used more easily, and at a cheaper price?"

Thus after the post-1983 peak in TI interest, TI dealers found themselves restricting their TI offerings, including other computer brands on the shelf—or going out of business. Many dealers boarded up shop, and some skipped town, often having taken payment from customers for goods that had not been in stock.

Dealers like Percherke and Nitka have survived by offering other computer brands as well as TI. Percherke began by adding Sanyo computers, which are IBM-compatible, and then Leading Edge. Nitka offered Apple, Commodore, and IBM. Yet, said Percherke, TI sales still comprise twenty percent of his sales. Said Nitka, "I have nights when I don't sell anything except for TI."

Those TI users seeking more than cartridges have found sources other than local dealers in many cases. Bulletin board services and telecommunications networks such as CompuServe, Delphi, and GEnie, offer ways for even geographically isolated 99'ers to exchange software. Of course, software through the networks is limited to the public domain or "fairware" variety, but there's a lot of good programs for the 99/4A in that category.

The remaining programs—commercial software on disk not usually offered by local dealers—are available either directly from the developers or through one of two large mail order/catalog houses supporting the 99/4A. Genial Computerware of Boston, Massachusetts, and Asgard Software of Rockville, Maryland (301/559-2429), are two software firms whose programs are geared towards the TI'ers with more than just consoles.

According to Chris Bobbitt of Asgard, there are about 25 local dealers across the country who stock Asgard products. Bobbitt estimated that 10% of his sales are to local dealerships. The rest are either through direct orders or distribution to Triton and Tenex, the "big two" mail order houses supporting the 99/4A.

"At least 50-60% of my business is through Tenex and Triton," said Bobbitt. "They can call up and order 400 of something at one shot."

Bobbitt rejected the idea of offering most software in cartridge form to appeal more to local dealerships. "The console was a great machine...in 1979," Bobbitt said. "Trying to put our software into cartridge form is like trying to put a size twelve foot into a size three shoe."

Barry Traver of Genial Computerware said that the company's software is aimed at those who have full-blown 99/4A systems, usually with "multiple disk drives and ramdisks." Genial has a few dealers, but mostly uses direct order and local TI faires for its sales. Genial might someday also have a section in a Triton or Tenex catalog.

Triton Marketing (800/227-6900) has a unique position in the TI community. A company that markets books, tutorials, and programs for Ashton-Tate, dBase, and others in the PC world, it suddenly found itself involved with the 99/4A when Texas Instruments charged it with distributing remaining stocks of 99 equipment after the '83 pullout.

"We were given the names of about one million TI-99/4A owners," said Terry Miller of Triton. "We have sold something to 300,000 of them." Such volume, as Bobbitt pointed out, is extremely large for a community like that of the 99. Triton publishes catalogs throughout the year, assuring that each of the original million customers receives at least two.

"The overall response has declined," said Miller. "Yet there is a core group of very committed people to their TI-99/4A and we plan on continuing to support these people for a long time to come." Triton not only offers old TI hardware and software, but has worked out deals with many third party manufacturers for the distribution of both disk and cassette software. Miller welcomed interested parties to contact him (415/574-2559) for more information on offering innovative programs to the large TI audience Triton reaches.

"With us," Miller said, "no sophisticated dealer or distribution network is needed. We offer people a way to get to the marketplace." And with most other ways being blocked, Triton is suddenly a major force keeping the flow of commercial hardware and software going for the 99.

As Tenex and Triton compete, prices remain reasonable, although help and service on products is much more difficult than through competent local dealers.

What of the future? It looks like what remaining commercial support the TI community has plans to stick around for the forseeable future. "Nobody with any brains would think you could live very long with a machine that's been discontinued," said Percherke. "It's amazing today that six years later there's still software and hardware, amazes me year after year."

And although Percherke hasn't sold a piece of TI hardware in "six or eight months," he believes he will always carry products of some kind for the 99/4A. "It looks like this machine is going to last and be worth my while for another six or ten years, possibly forever," he said.

"I keep saying to myself," maybe I should get rid of some if this stuff,'" Nitka chuckled. "Then someone comes in and asks for a strange one and I'm happy to have it in stock. TI is definitely not washed up yet."

"The TI simply refuses to sit down and die," declared Traver.

The impact of Myarc's 9640 computer, a card that fits into the TI Peripheral Expansion Box (reviewed in the April '88 *Computer Shopper*), is uncertain. The local dealers do not see

continued on page 241

ATARI

Applying The Atari continued from page 232

ined the contents of the ROMs and was surprised to learn that they are not 5200 ROMs at all, but games for a system I used to own, the Bally/Astrovision Professional Arcade. Since it is a Z-80 based machine, I fear the chips won't work in the Atari. I don't blame Lolir, though. They probably believed whatever the seller told them.

Robert Davis was looking for a VT-100 emulator in the same column. B & C Computervisions (3257 Kifer Road, Santa Clara, CA 95051, 408-749-1003) has a Public Domain library and shows a VT-100 emulator for the Atari 800. (It needs a translator for the XL/XE.) It is disk #PD037 and sells for $5.00.

I also have a request: Can anyone tell me how to get decent resolution on the Commodore 1902A monitor with the Atari 130XE driving it through the Composite Video input? I get a lot of artifacting and some smear, and the color background seems slightly out of register with the bright letters in the foreground in 40-column mode (80-column is about as bad as a TV).

Also, do you know how much interest there would be in a relatively simple (half-a-dozen chips) text-to-speech machine which plugs into the parallel printer port? I'm talking about a do-it-yourself article with drawings and possibly photos. No programming is required, so you could use the unit with Infocom games, for example. (Just what everybody needs—the ability to have everyone in the house hear of your untimely demise while playing "Leather Goddesses of Phobos!")

SSG Richard C. Tietjens
Bavaria, West Germany

Thanks for sharing the information. Reader Paul Strutz was indeed using real Atari 5200 ROMs, and the reason why they would not work on the 8-bit computers was because of hardware and operating system differences described in last month's column by Bill Hicks. I'm glad that you mentioned the Lolir ROMS, however, in the event that some readers have been trying to use the ROMs with actual 5200 machines. If the ROMs are truly 5200 ROMs, you should be able to replace the ROMs of a cartridge with the new ROMs and get a working game cartridge. I haven't examined the ROMs offered by Lolir, and cannot verify if they indeed are Bally/Astrovision ROMs.

As for your suggestion of a text-to-speech machine for the parallel printer port, I don't know how much interest there would be in such an article since the fascination with speech synthesizers has faded considerably. Your best bet would be to modify an existing text-to-speech device or one of the several voice synthesizer projects that have appeared in magazine articles for the 8-bit Atari. A program such as SAM (Software Automatic Mouth, a software-based text-to-speech synthesizer for the Atari) rewritten to hide in unused memory and to read the text buffer sent for printer output would be ideal.

Newsletter Honorable Mentions

Last month the *Michigan Atari Magazine* won the title of best newsletter, and this month we'll take a look at several other well-designed newsletters that were submitted for February 1988.

Phoenix, the newsletter of the Toronto Atari Federation (5334 Yonge St., #1527, Toronto, Ontario, Canada M2N 6M2), was a previous "Best Newsletter" winner. The February issue contains an "On The Boards" section, with bulletin board information and question/answer conversation excerpts, a review of Gauntlet and the new XF551 disk drive, a MIDI column and a rumor and information column.

The *BAACE Newsletter* is the newsletter of the Blue Angel Atari Computer Enthusiasts (c/o Luke Hanley, 2731 Semoran Drive, Pensacola, FL 32503). The February issue features mail and news columns, reviews of Bop'N Wrestle, Wizards Crown, Infiltrator, and a local BBS listing. The newsletter makes excellent use of graphics and fonts. The public domain programs, for example, are rated visually by bar graphs on four qualities.

The February *PACUS Report*, the newsletter of the Packerland Atari Computer Users Society (2714 South Eleventh Pl, Sheboygan, WI 53081), features several interesting columns, news, and reviews of Awardware, Spitfire 40 and MIO. The newsletter utilitizes fonts and icons in a very neat and attractive layout.

The *Acorn Kernel* is the newsletter of the Atari Computer Owners of Rochester, New York (P.O. Box 23676, Rochester, NY 14692-0676). The February issue features columns on BASIC, news, and reviews of the SX212 modem and Daisy-Dot II.

The February issue of *Sorcerer's Apprentice*, the newsletter of the Michigan Atari General Information Conference (28111 Imperial Drive, Warren, MI 48093), features 8-bit Atari news, an article on the Atari's redefinable character set, a machine language routine and other interesting articles.

We'll look at reader mail and more news and products for making the most out of your 8-bit wonder.

Readers' comments, questions and contributions are welcome. Address all correspondence to: Jeff Brenner, "Applying The Atari 6/88" P.O. Box F, Titusville, FL 32781. ●

TEXAS INSTRUMENTS

TI Forum continued from page 240

it catching on in their areas and have received few inquiries. "Those who were interested at first got tired of waiting and bought IBM-compatibles," said Percherke. "If we could sell a 9640, we wouldn't bother," he added. "There's a mimimum order of 3-6 machines to become a dealer, and there just isn't that demand."

"If two people come in and say they absolutely want one, I'll do it," said Nitka. "But it'll never happen."

Possible third party software developers for the 9640 might go so far as to ensure compatibility with 99/4A software, but seem reluctant to work on producing software that takes advantage of the extra capabilities the 9640 grants the 99/4A environment. "That's a little farther down the road," said Bobbitt. "I don't expect to see a great deal of 9640-specific software out there."

There is one TI dealer that simply bubbles with enthusiasm for both the 99/4A and the 9640. Barb Wiederhold, owner of the Queen Anne Computer Shoppe in Seattle, Washington (206/522-6558), is staunchly and completely TI-specific. She began in October of 1983, because there was "a need," and has since been labeled "TI evangelist extraordinaire." "The only problem with the TI market is that they don't know where to find the dealers," said Wiederhold. "All we need to do is get the word out."

"Most who shop here don't have expansion systems," she said. "But once we show them what they can do, they want them—it's just a question of advertising."

Wiederhold offer a 24-hours, 300/-1200 baud bulletin board (206/361-0895) for direct purchases and discussions of TI products. The board boasts 168 9640 users, including three from Italy.

"I think fairware isn't such a great idea," said Wiederhold. "People would buy the software in the computer shop or a catalog." According to Wiederhold, the Shoppe breaks even financially, and as long as it supports itself, she is willing to work there. "I'm not making any money," Wiederhold said. "I'm providing a service."

Amazingly, there is enthusiasm and activity within the TI community that defies the fact that the original supplier and manufacturer has long abandoned it. While the users groups continue to meet and support faires (notes Traver, from Philadelphia, the TI group there is second only to Apple and IBM in popularity), the bulletin boards remain in operation, the local dealers offer further information and software, publications print TI-specific news, and Tenex and Triton keep mailing out catalogs, the TI-99/4A will not die. It's the users of those other brands who are missing out.

Ron's Part

Summer is upon us and, as opposed to the usual "doldrums" in computer activity, the TI world is alive with activity. Just goes to show you again that the 99/4A community does not follow the prevailing breeze in the computer world. It's a nice breath of fresh air, certainly.

New Software

Paul Coleman of "Nameloc Software" sent us a copy of his latest release,

continued on page 250

TIMEX/SINCLAIR

Sinclair Survival continued from page 236

as well. Going online? You may want to spend some time reading the portion of this chapter which relates to interfacing and using a modem. Even game software (even though the QL is billed as a business computer) gets looked at in the final chapter.

Five appendices follow, making this the most complete and easy to use book on the Sinclair QL that I have ever seen. Even if you think that you know your QL I would highly recommend the purchase of this book as an addition to your QL library. I am sure that you would find a few new pointers between its covers.

It is amazing how time flies, especially when dealing with the Sinclair computer community. It does not seem that long ago that I first noticed an advertisement in *GAMES* magazine for a real computer priced at just $99.00! That computer came with just 1K of memory although it boasted an 8K ROM with built in BASIC. I ordered it and soon was hooked. (Yes, I added 64K of memory—quite a lot for any computer in those early days). Soon I was writing software for my (then) photography business and a gradebook for my wife. When I saw the poor quality of the software being marketed by Timex, I soon found myself putting my software on the market—quite successfully. The T/S 2068 followed and then it happened—Timex pulled the plug. My determination to keep the Sinclair community together and help each other coincided with Stan Veit's call for the same thing. Thus, in June 1984 this column made its first appearance. As we start our fifth year together I once again have to thank Stan and the entire *Computer Shopper* family for being as supportive of the Sinclair community as they have. Thanks gang! ●

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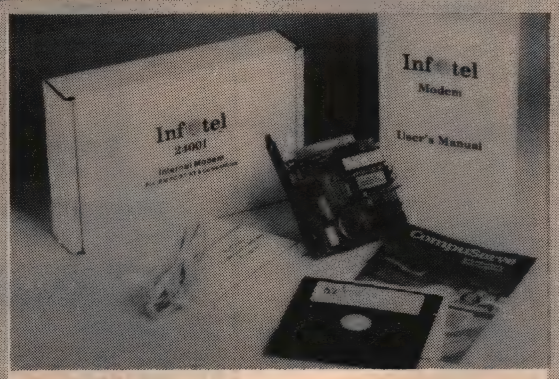

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MISCELLANEOUS

MIDI Column

by Jeff Berger

This month we'll start looking at the most common forms of MIDI data—Note On and Note Off commands. They do just what they sound like they would do—turn notes on and off—but what notes? Part of the MIDI standard is a common numbering system where notes across a 10 octave range are labeled 0-127 chromatically from bottom to top. On a 5-octave keyboard, the lowest C is MIDI note 36, middle C is 60 and the highest C is 96. Note that some instruments only send and receive notes in their keyboard range and not beyond.

A Note-On command consists of three pieces of information (other than the fact that it's a Note-On in the first place)—the MIDI note number, the channel it is being sent on and the velocity with which it was struck.

You may prefer to think of velocity as force—the more force you exert musically, the faster the key is struck. Velocity is almost always routed to effect volume—the faster/harder you play, the louder the sound and the slower/lighter you play, the softer the sound.

Velocity is determined by the time it takes for a key to go from its resting position to Note-On. The only direct control the player has over velocity is how the key is played. Velocity values also range from 0-127 with zero being the slowest velocity/lightest touch/softest volume and 127 being the fastest velocity/hardest touch/loudest volume. (These numbers have nothing to do with the MIDI Note Numbers, they just have the same possible range of values.) Some more sophisticated devices allow velocity to be routed to control other parameters such as brilliance or detuning. Another feature that's showing up more is the ability to scale the velocity "curve"—whether the range of 0-127 corresponds to your playing with a linear curve or exponential curve. See your owner's manual because the details are different from unit to unit.

Let's say we've got two synthesizers hooked up as master and slave. When you press a key on the master keyboard, the instrument's microprocessor sends a packet of data to the MIDI Out jack that says "If you're receiving on this channel, play this note at this velocity." Assuming the slave instrument is receiving on the same channel, it says "That information is for my channel, so I'll play that note at that velocity." If the slave is set to a different channel it says "That information isn't for my channel so I'll ignore it."

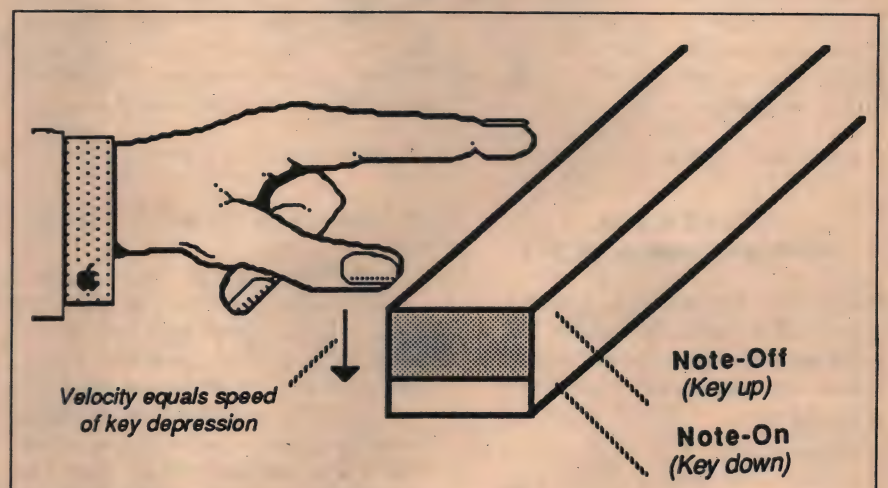
Velocity is not implemented on all masters and slaves. Some keyboards, for example, still have organ style keyboards where the notes are either on or off with no control over volume. These instruments typically transmit a median velocity of 64. Conversely, some instruments cannot act on variations in velocity and always play at the level set by the volume control. There are also some products on which manufacturers have cut costs by implementing response to velocity electronically, but have not built velocity into the keyboard itself. In this situation the instrument cannot generate velocity information but can receive it.

Now that we've turned the note on, it's going to stay on until we do something about it! Technically, it will stay on until it receives a Note-Off command corresponding to that note. When the note is released on the master keyboard or computer, the unit's microprocessor says "If you're receiving on this channel, turn this note off at this velocity." The slave on that same channel says "That information is for my channel so I'll turn this note off at this velocity." Note-Off velocity is called release velocity and is very rarely implemented on instruments. A release velocity of 64 is sent and received on devices which do not have release velocity. Note: the MIDI spec says that a Note-On command with zero velocity

continued on page 246

MIDI Note Numbers For The Standard 5-Octave Keyboard

Figure 1



Velocity Is Derived From The Time Between Initial Key Movement And Note-On

UNIX

Unix: A RISC-Y Business?

by John Blair

For those of you who have been spared the bombardment of ads heralding the great CPU MegaHertz (MHz) race, allow me to assure you that in some advertising circles Mega-Herz are thought to be synonymous with mega-BUCKS.

Let us retrace our steps back a few years to the days of the first Apple where 1MHz was plenty fast. Or if you prefer think about the Z80 CP/M days when 2MHz was the speed we all worked with. Ten years ago, the rumored quantum leap from 2Mhz Z80 chips to 4 MHz was almost mind boggling. I don't know about you, but I got some quite decent graphics done with an Apple 10 years ago—good enough to convert to 35mm slides and show at meetings of boards of directors. I also used a multiple Z80 CPU machine that had four slave CPUs and one master to handle one of the first multi-user CP/M systems—years before MP/M tired to make an impression.

The 4.7MHz 8088 CPU in the first IBM PCs in 1981 seemed quite adequate to me. The 8MHz AT in 1984 garnered universal admiration. What went wrong?

Windows is what did us all in. We used to call Windows simply "split screens"—a capability that many CRTs had even 10 years ago. But for some reason, we decided that it would be "more productive" to juggle several programs at once, thereby converting what was essentially a single-user PC into a multi-programming workstation.

Nowadays, to run Windows 386, you must have a 386 machine running at 16MHz and 2 - 4 megabytes of 32-bit RAM memory. Do we really need that ability? Are windows the end-all of productivity? I think not. Desqview (Quarterdeck), Carousel (SoftLogic Solutions), and Concurrent DOS all vie for our split personality windowed psyches.

I think it is time to say "I'm mad as hell and won't take any more windows!"

Multi-Tasking—Not Windows

What alternatives are there to those who must juggle several programs at one time? Well, Unix has been doing multi-user and multi-tasking for almost 20 years now. I can sit at my 101 key extended Compaq 386 keyboard and switch from one work session to another simply by hitting ALT-F1 ... F12 under SCo Xenix 386. Not only that, but I can also switch from Unix sessions to DOS sessions under MERGE 386 from Locus. I can do the same thing with VP/ix from Interactive and Phoenix, but, to my mind, not quite as gracefully.

I don't need a window to switch sessions. The screen just goes blank for a moment and then brings up a fresh working area as I start a new session. Once I have several sessions started, I can hop from one to another and see how each one is progressing—they all keep running no matter if I am

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Update On Bible Searching Programs

by Robert DuFon

Since the article in the December 1987 issue of *Computer Shopper* where several Bible search programs were reviewed, many more such programs have come to my attention. One is a program called CompuBIBLE by NASSCO of Borger, Texas. It is perhaps the "Rolls Royce" of all such programs. It does about everything one could ask of a program of this kind. There are certain things I would like to do with a search program but the ones reviewed in the December issue all fell short in one way or another. This program does it all. But enough of the praise. Let's see what it can do.

First, CompuBIBLE is the main program. Also available are Genesys Bible Window and Strong's Hebrew-Greek Dictionaries. It depends upon how much one wants to do but I would strongly advise getting the Genesys window utility which adds useful features to this versatile program.

CompuBIBLE will find every verse in which a word, phrase or pattern is located. It can do up to 25 searches at one time. It will display the verses in context, and it has various printout options. It provides for custom-designed printouts with selectable column widths fitting them exactly to your needs. At any time that verses are showing, chosen ones can be sent to the printer with the F3 function key. A really nice feature.

In word searching, separate words can be arranged with special operators so that "angel" precedes "dream" in the verse. This can be together with a wild-card word such as "night" which may be marked to be found with precedence or just anywhere in the same verse. There is also a "not" operator so that the "angel-dream" verse having the "not" word will be bypassed. The search for a phrase or sentence can be made with the option of waiving the punctuation. This makes it nice because Biblical punctuation is not what one might expect it to be, and the option of leaving it out makes for a more accurate search.

The main menu has seven operations to choose from: Concordance, Edit, Print, Scripture, Utilities, Index-Management, Options, and Quit. Each menu has up to six active function keys to help simplify getting around in the program.

I am showing what is on the actual program rather than in the manual because they differ. The program is Ver. 1.3 whereas the manual is Ver.1.0. It is expensive to keep a manual current with improvements but an addendum should have been provided and I understand that it is now being furnished. The program has also been updated February 3, 1988 with several new features.

Concordance has six operations: Create will allow setting up an index of verses. Options lets you set the parameters for the search. Range allows for the number of verses to cover. Analysis is a very helpful utility which lets you link up standard English words to the Biblical English. Search initiates the search after all parameters are set and Quit simply exits the Concordance phase and gets back to the main menu.

Edit has eleven operations: Edit selects an index. Verse sets up the context. Insert allows another index to be added. Move puts the new index into position. Delete removes a reference. Title will change the title of the index. Order is a sort program that arranges the indexes in chapter and verse order. Create is somewhat complex. When a list of references gets too long or needs to be divided, this utility makes it extremely easy to do. Save puts all work done onto the disk. Remove will remove a reference. Quit goes to main menu.

Print has five operations which need not be expanded on here: Format, Default, Print, List-Print and Quit.

Scripture has nine operations: GoTo asks for Book, chapter and verse. In-

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MIDI Column continued from page 245

should be interpretted as a Note-Off command. In the early stages of MIDI, some manufacturers did not adhere to this which caused a few problems.

Problem:

Notes stick on a slave device when you stop a sequencer.

Solution:

1) Look for a Mute switch on the instrument, which essentially turns off all its voices.

2) Try switching modes, like from Poly to Omni and back or Poly to Mono and back.

3) Change presets.

4) Play the same note that is sticking repeated.

5) Play more keys simultaneously than the instrument voices for.

6) Try stopping the sequencer during breaks between notes—notes can't stick if they're not turned on in the first place.

7) If all else fails, turn the instrument off but if things get that drastic on a regular basis, plead your case to the manufacturer(s) in question. Again, every piece of equipment is different.

You may have noticed that nowhere have we mentioned note timing values. MIDI does not send information like "This is a quarter note." Instead all timings are gotten directly from the musician's performance and communicated as real-time Note-On and Note-Off commands. This is another reason why the MIDI delay we mentioned in previous columns can cause problems. Different instruments in a chain see and act on the same information at different times because of transmission delays.

Active Sensing. As we mentioned earlier, once a Note-On command is received by an instrument, the note will stay on until it receives a matching Note-Off command. Now let's say that the MIDI cable gets disconnected between the Note-On and Note-Off commands—the note will sustain forever. This may lead you to the proper conclusion that this procedure should not be used!

A feature called Active Sensing has been developed which allows a slave to sense that such a break has occured and correct the situation by resetting or sending an All Notes Off command to itself. If a slave device sees an Active Sensing command come in its MIDI In port, it starts timing while it waits for any MIDI event. A signal is expected every 300 milliseconds and if the slave doesn't see one at the appointed time, it turns off any notes that might be latched on. If it does see a message at or before 300 ms, it starts timing all over again as it waits for the next one and makes the same decision.

Look under MIDI Enables or similar section of your instruments because the master and slave may each have functions which enable and disable Active Sensing. In a situation where a slave is set for Active Sensing but the master is not capable of transmitting it. In this scenario, Active Sensing never engages in the first place because the slave needs to see an initial Active Sensing message before it starts timing and analyzing.

Running Status. While this is not a feature that the user has control over, it does pay to be aware of what's happening. We mentioned earlier that MIDI is a stream of data packets. Each packet is actually made up of a series of commands of various types. The first byte of each packet usually contains a piece of information called a Status Byte which tells MIDI devices what type of data the rest of the packet represents. So if a stream of Note-On data comes down the cable, each one is labeled with the same Status Byte. This can be viewed as redundant data that takes up valuable processing time.

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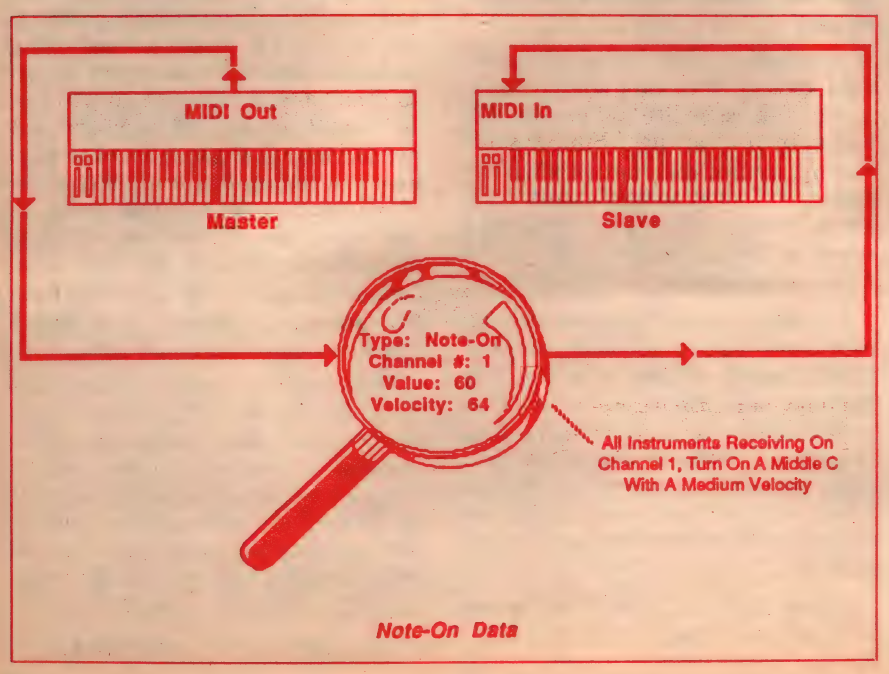

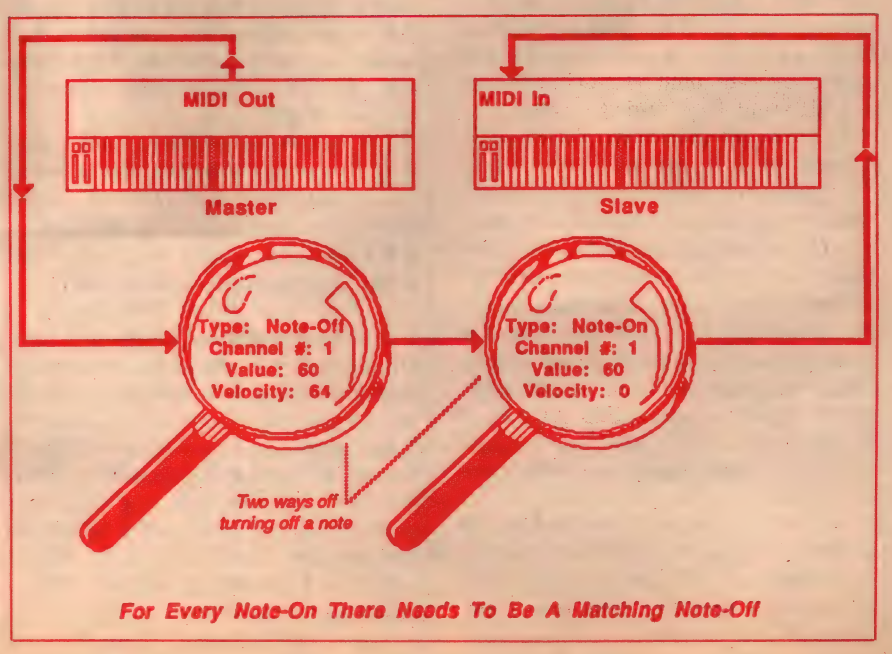

Bible Search continued from page 246

dex creates an index. Transfer moves reference into another index. Load will bring up an index. Match will find single words with the option of sending verse to printer or saving to disk. Window divides screen in half. Switch puts same range of verses from another version in "B" window for comparison of differing texts. Range specifies range of Books and verses. Quit goes to main menu.

Utilities has four operations. Insert allows putting verses into word processor documents. Divide is for long indexes. Wp-Install is for word processors not listed. Quit goes to main menu.

Index-Management has nine operations. Copy index from one drive to another. Delete marks index for deletion. Transfer marks index to be transferred. Rename changes name of index. Unmark removes index mark. Execute executes marked indexes. Merge merges two indexes. Log logs new drive. View for checking information and Quit.

Options has seven operations. They should be self explanatory. They are Screen, Drives, Printer, Auto-Save, Color, Install-Port and Quit.

There are a number of other utilities imbedded in subsidiary menus. In the Print menu, selecting Format will allow printing the verses referenced by the Index, print a directory of all the verse references, or split the screen into two columns so that verses are on the left and the right is open for entering notes, comments, cross-references, etc. User-Defined allows for custom designing of the printout.

There are too many such choices to list here. The manual also has shortcuts that can be learned for getting around in the program a little faster, too. The versatility of this program is sure to exceed one's expectations. The 110 page manual contains a short tutorial that will familiarize the user with the program and is sure to start the user off right. The manual for the window program is 46 pages. A demo disk is available for $5 and it is well worth looking at.

Many of the functions have to do with Indexes. It is important to have indexes because a single index, such as MAT 1:1 points to a verse which can be accessed for any purpose. To save the verses in files would add megabytes of text to the hard disk. Whenever a selected set of verses are wanted, it can be sent to the screen or to the printer by using the Index.

Inserting Verses Into A Document

The program will handle verse insertion very nicely with the Insert command in the Utilities menu. A menu lists various popular word processors to choose from. If yours is not listed, there is also an Install program to accommodate you. You simply enter the verse indexes into the copy in this manner:

```
//REV 1:6//
//MAT 3:8//
//GEN 1:1//
```

When you save the copy, these references and the verses are included. This worked flawlessly using WordStar.

Genesys Bible Window

The window program is an excellent tool and one should purchase it along with the CompuBIBLE. It can be used to insert Bible verses into a word processor document as it is being edited. While in Wordstar, for example, one can activate the window and request a verse of Scripture from anywhere in the Bible. As soon as it appears in the window it is ready to insert into the document at the cursor position.

One can insert the verses following the selected one by using a Block menu to select them, or new verses can be requested for insertion. Up to 150 verses can be sent in one block. Everything runs smoothly and quickly.

The speed at which copy is transferred from the window to the document may be too fast for some word processors. Transfer can be slowed from 1700 words per minute to 200 and to 80 wpm.

The window can be moved about on the screen with the cursor arrows. I prefer it in the upper right hand corner so I can see the beginning of sentences and because I can see full lines of copy at the bottom of the screen if I need to.

The program resides in memory and the window can be called upon at any

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TI Forum
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Graphic Lister. It is a companion to the TI Artist package. It makes Artist even more useful by making the graphics of Artist useful in generating mailing custom mailing labels. Actually, Lister is a combination of utilities. "Listmaker" is a BASIC program that allows you to build, save and edit a mailing list. Examples are provided. Once a mailing list is generated, there are three programs which are written in super fast c99 to do the actual printing. One takes all or any part of the list and print labels incorporating any 1x1 character TI Artist font. A second program can place a small (7x5) instance on your labels. The third utility allows printing of a larger (up to 12x10) instance along with an Artist custom font. Other utilities included will convert a previous Labelmaker data file to a "Listmaker" file. Other utilities are included as well. The Graphic Lister package requires TI Artist, 32K memory expansion, printer and disk drive. It loads from either Extended BASIC or Editor/Assembler. I think you will find it a super addition to your graphics collection. The software (along with Nameloc's Designer Labels package) is available directly from Nameloc (3971 S.E. Lincoln, Portland, OR 97214) or Texaments (53 Center St., Patchogue, NY 11772; (516) 475- 3480). Cost is an incredible $10 + $1.50 S & H. And, get this: you can get the c99 source code for the 3 printing utilities for an additional $5. A super offer. Take advantage of it.

There is a new compiler on the market. One of the laments of the TI programmer for some time is that BASIC and Extended BASIC on the 99/4A is not very fast. BASIC on other machines has the advantage of being "compiled," enhancing the execution speed of the code. The MSDOS and other machine types have several packages that take the native BASIC code and convert it to machine code thus markedly increasing the performance of the software. There have been a few attempts previously to accomplish this on the TI, all with varying success. Now there is another for your consideration. Douglas Martin of "DKM Enterprises" (P.O. Box 501046, Indianapolis, IN 46250-1046) sent along his XCOM compiler package. The software comes on a copy-protected disk and a 10 page manual. System requirements include a Mini-memory module (to load and execute the compiled programs), 32K memory expansion and at least one disk drive. According to the manual, the way the system works is like this: you save a BASIC or Extended BASIC program to disk with the "merge" option. Simply type "SAVE DSK1.XYZ,-MERGE", where "XYZ" is the name you want to give the saved file. "Wait a minute!," I hear you saying. You can't save a file to merge format from BASIC, right? Wrong. With the utility provided on the XCOM disk, you can. From BASIC with Mini-Memory plugged in, you simply type "CALL LOAD("DSK1.MERGE)", which loads an assembly language utility from the disk. You then can load your BASIC program in and save it "merged" with "CALL LINK ("MERGE","DSK1-.XYZMERGE")." Neat, eh?

Compiled programs are then loaded in from Option 1 of the Mini-Memory module. There are some limitations to the compiler as described in the manual provided. The BREAK, TRACE, UNTRACE, and UNBREAK statements are not supported. Some of the other statements calling for arguments may have to be modified as well. But, in general, the package appears to be perhaps the best of this genre to come along. Confession: I did not have a Mini-Memory module with which to run the compiler prior to this column's due date. Therefore, I cannot give you a firm "buy this." I hope to be able to, however, from what I see on paper, it is well worth your looking into. Why not drop a line to DKM for further details. Be a pal, and send along a SASE if you can as well. The price for the software is $49.95. Check it out!

How To Get Fairware

We often discuss the latest in offerings from TI programmers under the "alternative" marketing scheme called "Fairware" (or "shareware" or whatever). This is a "try before you buy plan" that enables small business ventures to get their programs out with a minimum start-up cost and allows the users, themselves, to do the marketing by spreading the software hither and yon. This plan has brought forth some of the best software around for the TI

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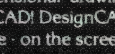

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TI Forum
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(PRbase, Fast-Term, the c99 programming language among others) are prime examples. The two most accessible for many TI users to get at this software are either through belonging to a users group (you do belong to at least one, right?) or through communications networks, either the local BBS or one of the major networks. Unfortunately, I have found that many of the readers of this column are neither in a users group nor have capabilities to telecommunicate. Where do they turn? Well, someone has filled the gap. Bob Neal (317 Hickory, Romeoville, IL 60441) makes available all the major fairware packages to those who fall into this predicament. For $2.50 a program (hardly covering the time and effort involved in c disk copying, mailing, etc.), Bob's Fairware Exchange will get these fine programs out to you. For his latest catalog, send along a SASE to him and check it out. I think you will find his service excellent and his offerings complete. Further, you will be amazed at what is available through the fairware marketplace.

Just "FYI"

Ali Ulgen, a member of the North-Coast 99ers in Ohio has completed a survey of some 700 plus TI owners nationwide, mostly user groups members from some 73 different groups. He has made the results of the survey available and they give a clear picture of the make-up of the "typical" TI 99/4A owner, at least those who belong to users groups. Here is the summary as published in the Charlotte TI 99/4A USers Group newsletter. (And I wish I could reproduce the illustration that accompanied this summary. Great work, Charlotte!)

The TI owner is a he, over age 45, with a college degree. He is self-employed or a professional, who uses a computer to some extent at work. He owns 2 TI's, one of which probably is at work. Only one system is full-expanded. On that system, he has standard TI equipment, a 32K memory card, a TI controller, one single-sided, single-density drive and perhaps a second external drive. He owns no hard dis, RAM disk, 9640, Turbo XT, Rave 99 keyboard, mouse, or anyone else's expansion card, and probably doesn't plan to buy one. His printer is a Star Gemini. One of his systems has a monitor, the other is attached to a television. He has about 25 modules, ome games, which he still likes to play. Outside of that, he uses his TI for word processing, doing letters and small tasks with it. He is trying to organize his life with the ideal database which he has yet to find. He programs a little, mostly in Extended BASIC. He occasionally uses a modem to connect to a friend's computer and transfers a program using a 300 baud modem. He is thinking about using a comercial computer telecommunications network. He attends his user group meetings which he wouldn't think of leaving—its his lifeline to continued enjoyment of his TI.

Well, how do you stack up?

The freebie winner this month is Marc Levine of Champaign, IL. Marc wins Recipe Writer II, Legends, Calendar Maker, and the Electronic Gourmet, all from Asgard Software (P.O. Box 10306, Rockville, MD 20850). Congratulations to Marc and thanks to Chris Bobbitt of Asgard for sending the software along. ●

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Secrets Of The Adam
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sometimes? The microprocessor within Adam is "house cleaning." To help cure this annoying problem, include a statement in your program, where screen printing isn't necessary, A = FRE(0). This statement will make the Adam do "garbage collecting" when it will be less noticeable.

Of course, you can PRINT or LPRINT the variable A to see how much free memory you have left, but in most game situations you will not want this to clutter your display. There is a practical side to the statement. If you are programming a database program, you may need to check the memory allocated and see if you have room for your files.

Colors! Colors! Colors!

Are you tired of black & white on your Adam? Well, type in the following program and save it as HELLO on

continued on page 254

New Multi-user dBase Compiler Eliminates Costly Networks

A new dBase compiler running under DOS 3.x, available since January 1, 1988, allows up to four users to simultaneously run dBase III Plus compatible programs from a single PC.

MultiBase was initially introduced to provide a "multi-user base" for existing applications requiring more than one user. Applications such as SBT's Database Accounting Library have been compiled in MultiBase without modification and are now successfully operating in user installations. In general, most dBase III Plus compatible applications can be compiled and run, without change, in this multi-user environment.

MultiBase is also a development system in its own right. The initial version supports most dBase III Plus commands in addition to its own and other popular enhancements. Macro functions, user-defined functions, and full-screen commands are all supported in a dot prompt environment closely resembling that of dBase.

MultiBase includes a text editor that automatically compiles programs, giving syntax errors while still in the editor. Because the compiler is integrated into the system, the user is not aware that compiling is acutally occurring—an advantage to the end-user who is accustomed to interpretive dBase. All code is compiled to a combination machine code and p-code language, giving MultiBase a definite speed advantage over interpretive dBase.

Because it is multi-user, MultiBase supports all of the networking commands and functions defined by dBase III Plus, including full record and file locking. In addition, single user programs can be run in the multi-user environment by invoking a unique AUTOLOCK command. This single command, which can be typed at the dot prompt, allows an application written for a single user to be instantly given the security necessary for a multi-user environment, maintaining data integrity.

On the hardware side, MultiBase requires no networking boards or other special hardware. Four users are supported per processor, with one user working from the PC monitor and the other three working on terminals connected to the PC through standard serial ports and RS232 cables. The terminals can be any TeleVideo, WYSE, KIMTRON, or VT100 compatible terminals. Tools and instructions are also provided in MultiBase that enable the user to write a new driver. Standard IBM PC/XT/ATs, PS/2s, or most compatibles will run MultiBase.

MultiBase also supports its own local area network. This LAN simply requires an RS232 cable connected through the serial ports between any two processors. Each processor supports multiple terminals. The convenience of being able to access data and printers on other processors can enhance most operations. Again, no special setup or overhead is required to support this LAN.

MultiBase supports a unique utility program called OneStop that provides the user with all the tools to support the system. These tools include password definition, data integrity checkout, status reports, directory setup, file copy, erase and deletion, network reports, tape and floppy back-up and restore, and technical hardware diagnostics.

The multi-user portion of MultiBase has been in use for over eight years on Z80, then 8086, 80286, and finally 80386-based machines. Professional Service Centers of Fremont, CA has been using this multi-user environment with a supporting proprietary database language.

The low cost of $699 purchases the development version of MultiBase with four user per PC and PC-to-PC network capabilities. A run-time version for developers at $169 per system will provide the end-user with the same multi-user ability. A comprehensive user's manual and software support are included with every package.

For more information, contact Cykic Software, Inc., 2728 Fifth Avenue, San Diego, California 92103, phone (619) 297-0182. ●

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Secrets Of The Adam
continued from page 252

your "SmartBASIC" tape [be sure to use all caps for the name]. Save it before you run it because line #9 clears the program from memory! You can, of course, name it by another name, then load and run it each session when you want color. You can delete line #9, and use the program, along with the random seed generator, at the beginning of your black & white programs. This will be useful only if line #9 is not present. If you run another program, then the random number generator starts at the beginning.

```
3 POKE 17115,113: POKE 17126,128: TEXT: FOR I=1 TO 2: VTAB
(7+I): HTAB 8: FOR J=1 TO 18: INVERSE: PRINT CHR$(130);:
NORMAL: NEXT J: PRINT: NEXT I
4 FOR I=1 TO 7: VTAB (9+I): HTAB 8: INVERSE: PRINT
CHR$(130) ;CHR$(130);: NORMAL: HTAB 24: INVERSE: PRINT
CHR$(130);CHR$(130): NORMAL: NEXT
5 FOR I=1 TO 2: VTAB (16+I): HTAB 8: FOR J=1 TO 18: INVERSE:
PRINT CHR$(130);: NORMAL: NEXT J: PRINT: NEXT I
6 VTAB 12: HTAB 12: PRINT CHR$(7); "SmartBASIC";: VTAB 14:
HTAB 13: FLASH: PRINT "In COLOR";CHR$(7);: NORMAL: VTAB 23:
HTAB 1
9 NEW
```

Be sure that you save the program as HELLO [use all caps] before you try to run it. Run the program after you have it saved. Neat? Huh? You can try different combos to get the one you like best. Any whole number from 0 to 255 can be poked into an address. For control of your screen/print color and /or INVERSE & FLASH colors see the Address section. When you poke into any address, use only whole numbers from 9 to 255.

Warning! Some combinations are unreadable and some are invisible! If you select the same color foreground as the background, then the print will be invisible. For your learning session: type a program that will change the background color and print a line down the screen in different colors. [Hint...a nested FOR/NEXT loop will do the trick, but don't forget the delay between them so you can view the color.]

While we are poking around in the Adam, be careful just what address you poke a value into! You will not destroy your computer, but you can wipe out several hours worth of work by accidentally rebooting, locking up the keyboard, or any of several other dastardly deeds. Be sure that you type in all poke addresses correctly before you try to run any program!

After you have finished with SmartBASIC, and you want to go to SmartWriter word processing without having to reboot every time, then do the following.

[Note: <E> means press the ENTER key! DO NOT type the <E>!]

```
Type:  POKE 17099,5   <E>
Type:  TEXT           <E>
```

Now press the "ESC" key, and {presto!} you're in word processing!

Addresses! Addresses! Addresses!

No article about a computer series would be complete without some of the RAM's addresses. Addresses are just like computers, or hammers for that matter. You can use the tool to build something, or destroy it! With the Adam, if you poke into any addresses below 27407, then you will most likely run into some problems, unless you really know what you are doing. If you Ever poke below 27407, please be sure that you have all valuable tapes & disks removed from the drives. A poke could send your system into a nasty crash and before you know it, you can destroy the contents of the tape or disk. Better safe, than sorry, Never poke below 27407 unless you know what the address is for!

A word about addresses. All addresses contain integers [whole numbers] between 0 and 255. Some addresses are pointers to other addresses. See numbers 1 through 8. Never randomly poke numbers into random addresses! You can peek any address! To peek an address is merely getting a COPY of the contents of the address into a variable. You can then LPRINT or PRINT the variable and see what number is there. No harm done. But if you poke a number into an address, you change the contents of the address; i.e. the old number is gone—replaced by the new number you just poked! Addresses #1 through #8 are given, not as poke ad-

continued on page 258

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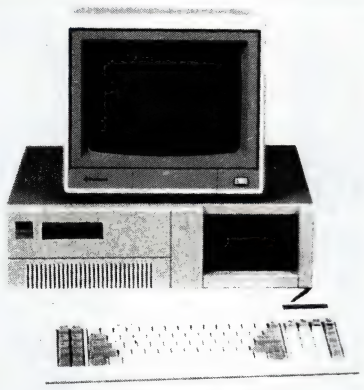

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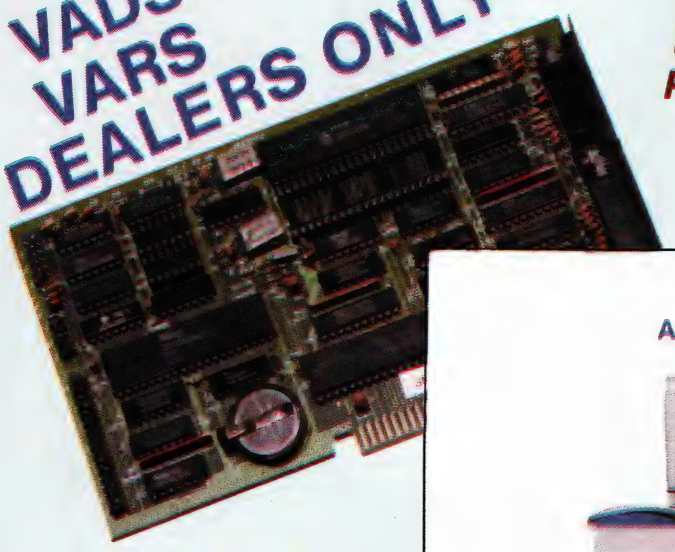

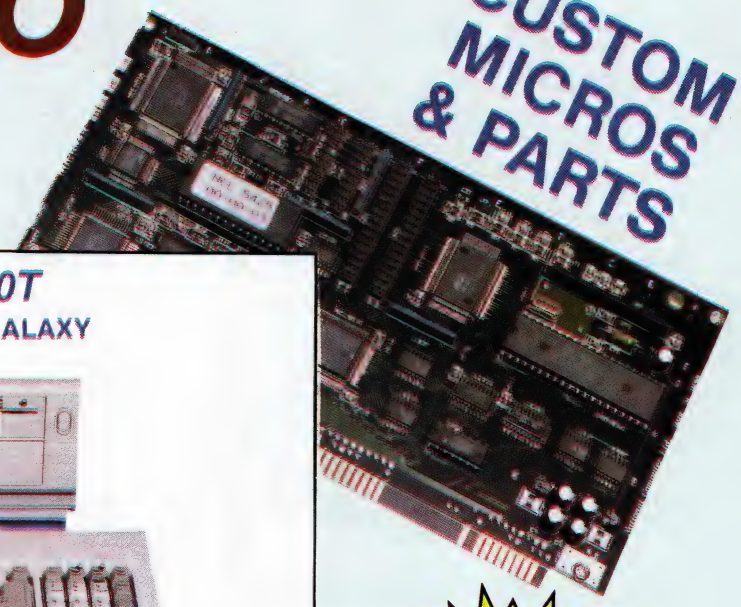

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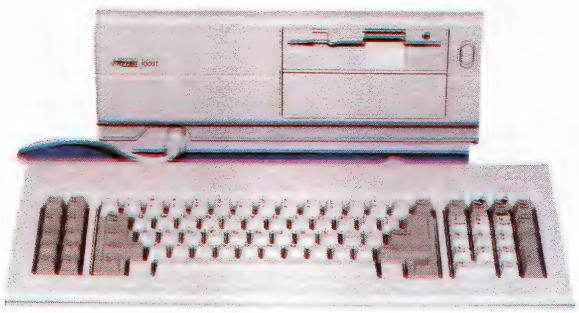

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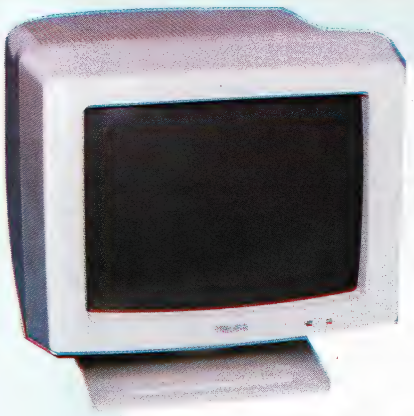

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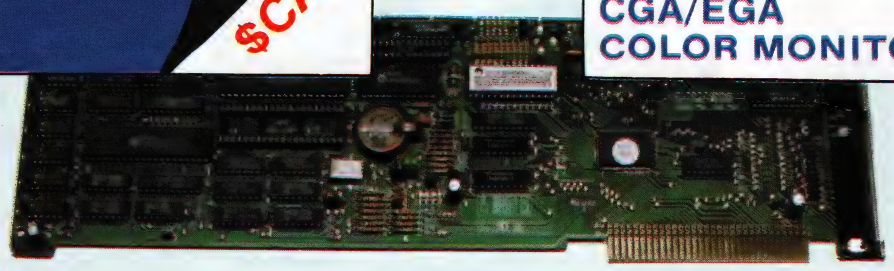

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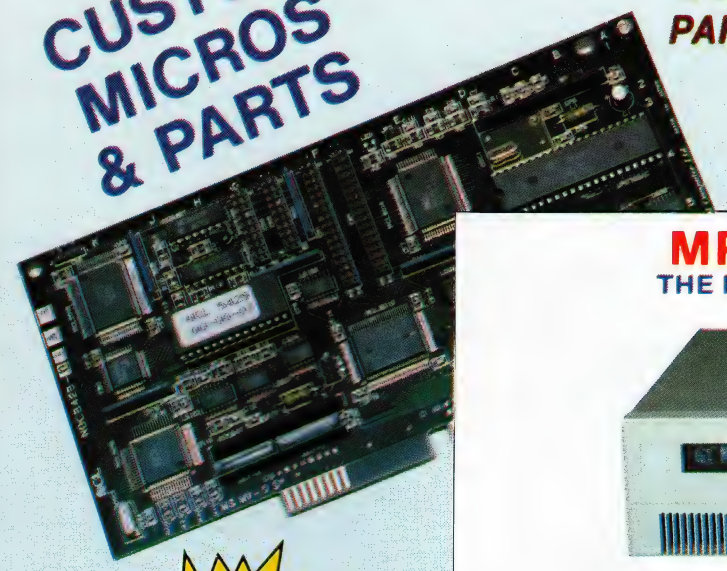

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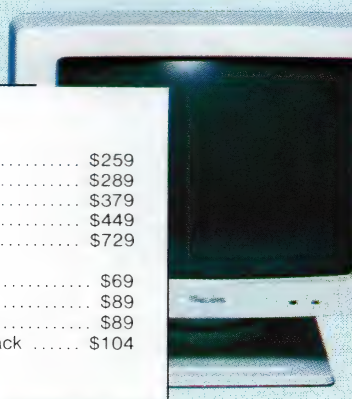

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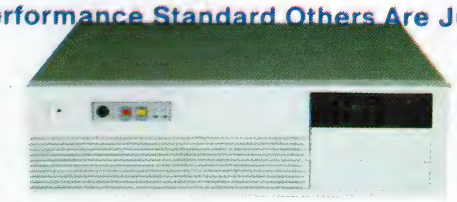

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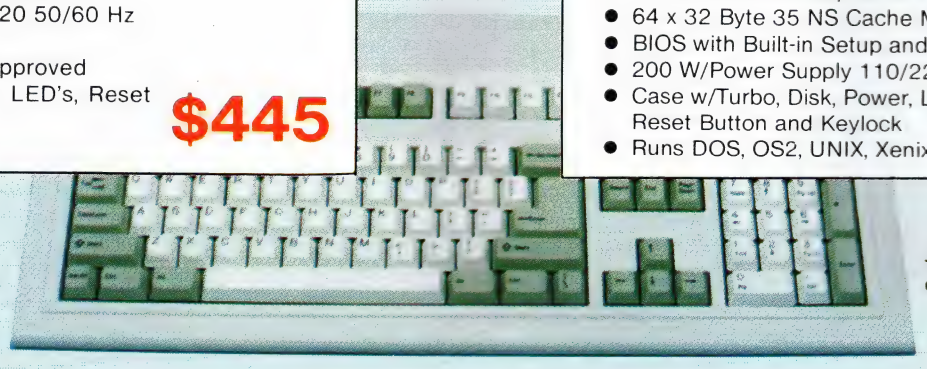

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dresses, but as references for your programs.

The addresses are divided into two sections. Addresses you can poke, and addresses that are best left as they are and used only as a reference if you find you need the information in a program.

The speed address, if poked, will merely speed up or slow down how fast your screen is printed. The shape table address can be poked, but unless your program uses graphics that call on the shape table address, then just leave it alone.

The addresses containing the number of lines, columns, and the top & bottom margins can be poked, but do your experimenting when you haven't got your important program in memory.

Finally, the poke to 17115 and/or 17126 is mentioned earlier. Used in the manner described, you will not cause a hang up or crash to occur. Addresses can be your friend, or your worse nightmare!

These are peek addresses only:

1. HIMEM address setting stored: 16089.
2. LOMEM address setting stored: 16095.
3. POINTER TO START OF NUMERIC VALUES: 16099.
4. POINTER TO END OF NUMERIC VALUES: 16109.
5. POINTER TO START OF STRING SPACE: 16111.
6. POINTER TO END OF STRING SPACE: 16115.
7. Line number where ONERR will GOTO is at: 16126.
8. A=PEEK(-651), or A=PEEK(64885) gives the ASCII code of the key pressed, i.e. the same as A$=INKEY$.

The following can be poked without crashes:

Speed setting is at: 16129.

[In your BASIC program, you can use SPEED = 100, or POKE 16129,100 for the same results.]

** Shape table address is at: 16766 & 16767. **

[Upon loading SmartBASIC this address is set at 26574. Do Not poke the above addresses unless you know graphics! If you happen to peek 16766 and 16767, then will notice that they do not add up to 26574 {max within an address is 255}. How do we get 26574? Hint: one of the numbers must be multiplied by 256 before adding them together! Some of the addresses listed in #1 through #8 are this same type, you must multiply one by 256 before adding the other address to it.]

You can make "windows" on your Adam for text displays.

17198 = number of lines on your screen.
Can be 3 to 23. Default = 23

17199 = number of screen columns.
Default = 30

17201 = top margin. Default = 0.

17202 = left margin. Default = 1.

A poke to the following addresses followed immediately by the TEXT command or the HOME command will allow you to control your screen output colors:

{In the following examples, x = an integer between 0 and 255.}

POKE 17115,x = screen/print color.

POKE 17126,x = INVERSE & FLASH colors.

While typing a program into the Adam, have you ever forgotten a single character within a long-long-long line, then have to go back and retype most of the line so you could just insert a character? A close look at the following control characters may help you:

{Use the INSERT SPACE control, then type in the desired character(s).}

[^ denotes the CONTROL key & must be used with the key.]

^ c = BREAK, halts program execution or listing.

^ h = backspace cursor: I always use the arrow keys.

^ l = clear display.

^ m = same as RETURN key.

^ n = insert space at cursor position.
[Use this to EDIT a BASIC program line.]

^ o = DELETE CHARACTER at cursor position.
[Use to EDIT BASIC program.]

^ p = print on SmartWriter the current screen contents.
[Be sure you have some paper in it! You can't stop this one!]

^ s = STOP the screen display. Use to pause both listing, or program displays.

^ x = DISREGARD line being keyed or response to INPUT command.

Another hint: if you have programmed in a machine language routine that isn't in a REM statement, and you want to use it in more than one program, then you should place the routine into the LOMEM address for protection from NEW, CLEAR, & etc. See your SmartBASIC manual under

continued on page 377

Mainframe Connectivity For Microsoft OS/2 LAN Manager

Microsoft Corporation and Digital Communications Associates, Inc. (DCA) has announced they have entered into an important strategic relationship for OS/2 networking. DCA has licensed Microsoft OS/2 LAN Manager, which it will distribute both separately and in conjunction with the DCA Select OS/2 Communications Server (CS). Microsoft is providing technical support to DCA in the development of the DCA Select OS/2 CS, which will provide a wide range communications facilities to connect PC local area networks to mainframe computers. The DCA Select OS/2 CS will be marketed by DCA.

Microsoft OS/2 LAN Manager runs on a number of leading networks, including IBM Token-Ring and popular EtherNet-based networks. The DCA Select OS/2 CS runs on top of Microsoft OS/2 LAN Manager. DCA's version of the Microsoft OS/2 LAN Manager will be named the DCA Select OS/2 LAN Manager (LM) and will interoperate with DCA 10-Net and provide an OS/2 upgrade path for the over 100,000 existing 10-Net users.

"We see this as a major advance in local area network capability," said Jon Shirley, president of Microsoft. "DCA will combine its high-performance, industry-leading communications software with the advanced, local area network features of Microsoft OS/2 LAN Manager to offer a new level of functionality and cost-effectiveness in providing mainframe connectivity to workgroups."

By building the DCA Select OS/2 CS on top of Microsoft OS/2 LAN Manager, DCA is able to offer a powerful SNA communication server that supports both OS/2 and MSDOS workstations. The DCA Select OS/2 CS is designed around the client/server architecture, where cooperating elements of an application can reside on a server and a workstation. This allows DCA, by allocating part of the processing to the server, to create a software package that requries less memory in MSDOS workstations, which are constrained to 640K of main memory. Also, using a server to package and transfer all information requests optimizes workstation computer time. Only one server connection is required to access the mainframe for the entire network user base, which saves substantial hardware costs.

DCA is desigining the user interface of DCA Select OS/2 CS to be consistent with the pull-down menu, Common User Access complaint interface of Microsoft OS/2 LAN Manager and OS/2 Version 1.1. The standard IRMA user interface will also be supported.

"OS/2 based servers running Microsoft OS/2 LAN Manager will be the centerpiece of personal computer networking in the future. We committed to building our communication server on top of Microsoft OS/2 LAN Manager because we believe it is going to be a standard," said James Ottinger, president of DCA. "By offering both products, we provide a complete solution for customers who want network access to powerful SNA communications capabilities."

As a part of this relationship, DCA will participate in the Microsoft Advanced Local Area Network Developers conference to be held in San Francisco on March 30-April 2 and in New York on April 13-15.

Microsoft OS/2 LAN Manager extends the power of Microsoft OS/2 operating system to local area network servers. It provides rich networking capabilities, including transparent file and print-sharing, advanced user-security, and network administration capabilities. It also supports remote interprocess communication so developers can create a new generation of distributed applications based on the client/server architecture.

Microsoft OS/2 LAN Manager will be released by Microsoft to OEMs in the second quarter of 1988. The DCA Select OS/2 CS and the DCA Select OS/2 LM are scheduled to ship from DCA in the first quater of 1989.

Microsoft Corporation (NASDAQ "MSFT") develops, markets, and supports a wide range of software for business and professional use, including operating sytems, languages, and application programs, as well as books and hardware for the microcomputer marketplace.

For more information contact: DCA, William Marks (404)442-4520; Microsoft, Marty Taucher, Kathryn Hinsch (206)882-8080; Waggener Group, Claire Lematta, Pam Edstrom (503)245-0905. ●

Quadram JT Fax For PC

Facsimile machines are becoming nearly as vital as the telephone in the communications loop. There are currently more than 2 million of them installed worldwide, with over 600,000 in the U.S. alone. Why? It's largely due to the big advantages facsimile machines offer.

*It's an inexpensive way to send hard copy compared to overnight delivery services which run from $8 to $15 per package.

*It provides a means to send hard copy within minutes without having to re-key data as when sending a telex.

*Group III facsimile standards are the same worldwide, eliminating the data transfer rate and file structure incompatibilities encountered with modems.

PC faxes offer the further advantage of being priced reasonably enough that they're becoming personal rather than departmental or office-wide commodities. Whereas a typical facsimile machine costs around $2,000-$3,000, the PC faxes average under $1,000. Among the PC faxes on the market, JT Fax by Quadram offers the greatest price advantage—it's $600 to $1,100 less than most of the competitors.

JT Fax also offers the advantages of:

Speed—It automatically strips out printer command sequences, converts file into fax format and sends it simultaneously. Other faxes require that file first be converted into ASCII format, then into fax format, then stored as a new file before sending.

Space—It doesn't use up disk space to complete the aforementioned processes. Other fax products can use up as much as 60K per page.

Convenience—It uses TSR (terminate and stay resident) software which provides the ability to access JT Fax from within other software applications.

The award winning JT Fax by Quadram is priced at $395 for the internal unit and $495 for the portable unit.

For product details contact: Quadram Facsimile Products Div., One Quad Way, Norcross, GA 30093-2919; (404) 564-5623. ●

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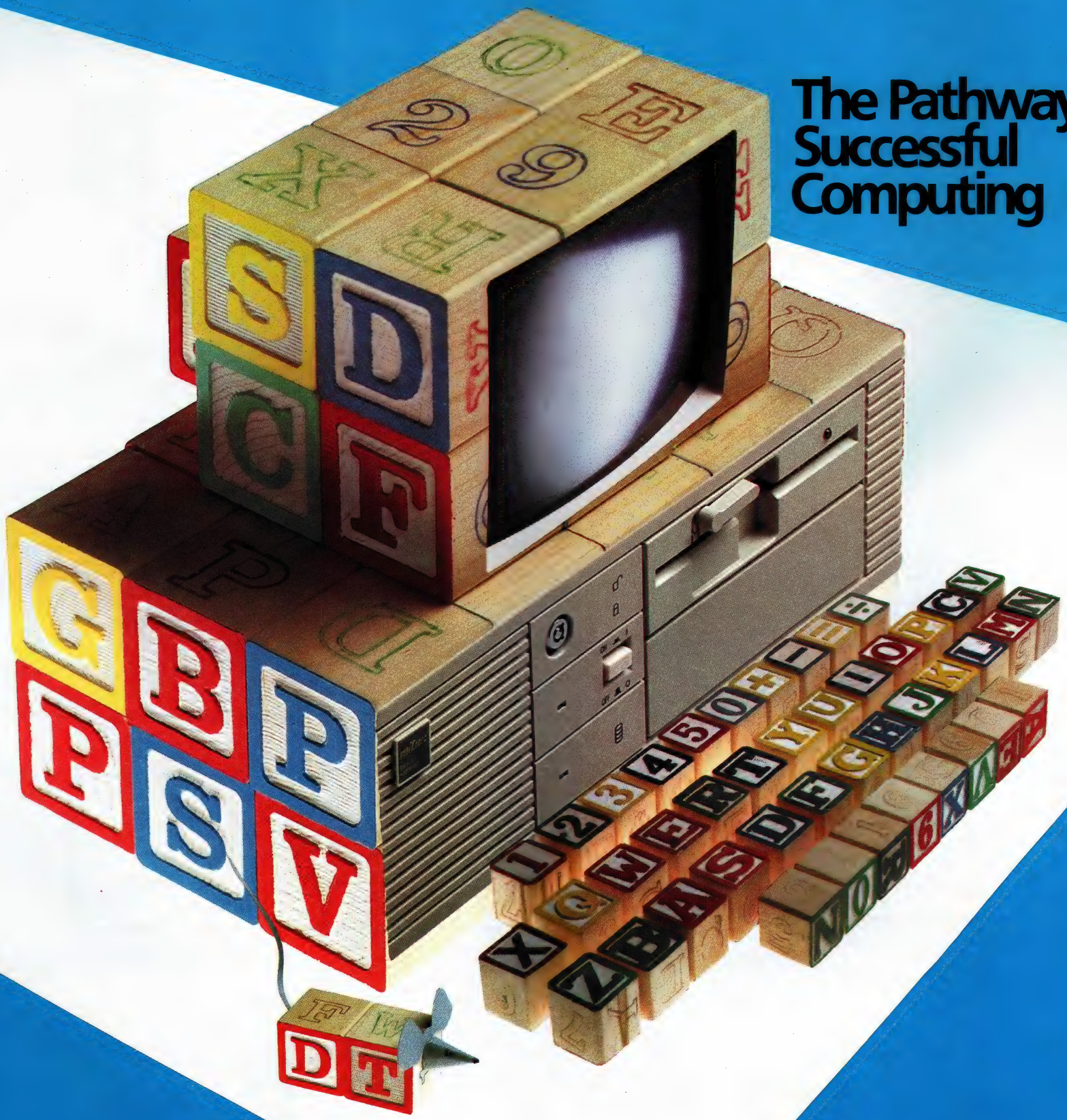

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Ask Dr. John

by John Heilborn

Q. I would like to save images from my television on my computer. Is this called digitizing? How is it done? I would like to be able to store and retrieve pictures on my computer as inexpensively as possible.

M.J.

A. Digitizing means translating any non-digital information (such as television picture, a photograph or even music) into a set of numbers which can be stored for use on a computer. Compact disks (CDs) contain millions of numbers that the CD player uses to reconstruct the sound that produced them. It does this by reading the numbers and re-translating them back into sound.

Similarly, video images can be translated into a set of numeric values that correspond to the original picture(s). When the pictures are taken from a video device such as a television, VCR or video camera the process is called video digitizing. However, a similar process can be used to capture images that are on paper. This is called scanning.

Scanners can read both pictures and text, allowing them to "retype" any text and enter it into your computer much as if you had typed it in yourself.

There are, however, some limitations to each of these processes. First, most digitized images do not have quite as good resolution as the original images. This is because a digitized image must have a single "bit" of information for every dot it stores. And if the image is not a simple black and white image it takes even more than one bit of information per dot. If, for example, the image has a lot of grey tones (like a black and white photograph) for example, then it might take as many as eight bits of information for every dot. And if there's color in the picture even this number can rise dramatically.

To give you a better idea of what I'm talking about, let's say you want to digitize a color picture that you've found in *National Geographic Magazine.* The picture is 4x6 inches and it has a resolution of 400 dots per inch for each of the four colors that make it up (magenta, cyan, yellow and black). So you need to store 400x400 dots for each level of darkness, for each of four colors times the 24 square inches of picture area to digitize this picture. That comes to more than one hundred million bits of information for a single picture! Needless to say, the limiting factor in digitizing images is memory space. So that's why we often choose to use less dots per inch when we save images. While this allows us to save the pictures in less space, they don't look as good as the originals.

The second problem is speed. If we use lots of dots to store images then it takes a long, long time to store each image and it takes nearly as long to reconstruct them when we want to read them back.

As far as price is concerned, none of these devices is cheap. However, there are a few things that you can look for that will help you select the less expensive units.

The first thing to look for is resolution. Lower resolution units tend to cost less. However, I would not get a scanner or digitizer that has less than 150 dots per inch. Second, look for features. Some digitizers and scanners support true halftone grey scaling while others only support a process called dithering which produces images that are not nearly as photograph-like. Finally, some units handle a process called OCR (Optical Character Recognition) which allows them to actually read text and enter it into the computer as characters, not just images.

Q. A few months ago I purchased an IBM XT computer with an AST Preview card. I purchased this combination because, even though I wanted to use my computer primarily for my business in monochrome text mode, I wanted to have access to programs that require color emulation.

Subsequently, I tried to use the DOS supplementary disk which was included with my computer and found that none of the programs that require color would work. When I contacted AST, they told me to run the following programs (which had been included with the board):

DISPLAY
BIGSCR
SMODE G

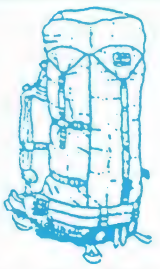
Unfortunately, these did not help. Why am I still unable to view graphics even after running the required programs?

M.B.

A. Since you have followed most of the instructions I would have initially

continued on page 469

Your BASIC Backpack



by Bob Albrecht & Don Inman

Your BASIC Backpack # 10

by Bob Albrecht & Don Inman

If you can read a comic book or a newspaper, you can learn to read and understand programs in BASIC. Well, you can if the programs are written so as to encourage humans to understand them. That's how we try to write programs in "Your BASIC Backpack."

You can learn to read and understand BASIC programs. You can learn to express yourself in BASIC and use it to make the computer do what you want it to do the way you want it done.

"Your BASIC Backpack" provides tutorials for beginners who want to learn how to use Microsoft BASIC and QuickBASIC. We also pose problems for you to think about, play with, and solve.

We pose more problems than we can solve in our allotment of pages, so please tell us which ones to solve. If you want a reply, send a self-addressed, stamped envelope. Send your comments, suggestions, complaints, kudos, whatever... to Bob & Don, P.O. Box 7627, Menlo Park, CA 94026.

Volkscomputer Using Educators

This is the year of the **Volkscomputer**, the world-class machine, the incredibly powerful, wonderfuly inexpensive, **MS-DOS** PC clone. You will find multitudes of them as you browse **COMPUTER SHOPPER.**

We like to hear from teachers who use Volkscomputers in the classroom, the computer lab, or at home for personal use. In the meantime, here are some resources.

shareware

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The all-purpose source of **shareware** and **public domain software.** More than 1000 disks (16000 programs) at $6 a disk. **PC-SIG Directory** (423 pages) for $12.95. **ShareWare Magazine** for $20/year (6 issues). **Up and Running in 15 Minutes** (book) is a guide to 8 shareware programs -- $9.95.

The BASIC Teacher magazine, 2814 - 19th Street, San Francisco, CA 94110. Schools: Send a request on school letterhead for a **FREE** sample copy.

DOS Made Easy by Herbert Schildt and **The Shareware Book** by Emil Flock, et al. Both from Osborne/McGraw-Hill, 2600 Tenth Street, Berkeley, CA 94710.

We would love to start some sharing with Volkscomputer Using Educators. If you are one, please write. If you send us the usual self-addressed, stamped envelope, we'll send you some stuff to help sharing begin. Please tell us if it is OK to list your name and address so other Volkscomputer Using Educators can write to you.

Teach Yourself BASIC

This section is for beginners. We'll try to help you learn how to read and understand Microsoft BASIC for the Volkscomputers, the MS-DOS machines.

We began this section in the January, 1988 issue of **COMPUTER SHOPPER.** In the previous episodes, we used several special words that BASIC understands.

BEEP	FOR...NEXT	LINE	RANDOMIZE	TIME$
CHR$	GOTO	LIST	READ	TIMER
CIRCLE	INPUT	LOCATE	RESTORE	WIDTH
CLS	INPUT$	NEW	RND	
COLOR	INT	PRINT	RUN	
DATA	KEY OFF	PRINT USING	SCREEN	
DATE$	KEY ON	PSET	SOUND	

Read about these BASIC Keywords in your BASIC Reference Manual

IMPORTANT NOTICE: We show BASIC keywords in all upper case letters (PRINT, INPUT, COLOR, and so on) and variables in lower case or a mixture of upper and lower case (row, Row, code, etc.). However, when you LIST a program on your computer, don't be surprised if variables appear in all upper case.

World's Most Expensive Adding Machine

Last time we showed you how to replace your $10 solar-powered calculator with your $1000 computer to do simple things such as balance a checkbook.

You had to hold down the CTRL key and press the BREAK key to end the program. Here again is the program with a little something added. First, a sample run of the new check balancing program.

continued on page 262

BASIC Backpack continued from page 261

```
The date is 03-17-1988
The time is 8:23:22

I will help you balance your checkbook.
Enter a check as a negative number and press ENTER.
Enter a deposit as a positive number and press ENTER.
To quit, enter zero (0) and press ENTER.

Old balance? 123.45

Check or deposit? -3.95                    A check.
The new balance is              119.50

Check or deposit? -25                      A check.
The new balance is               94.50

Check or deposit? -89.25                   A check.
The new balance is                5.25

Check or deposit? 50                       A deposit.  Just in time!
The new balance is              55.25

Check or deposit? 0                        Enter 0 to quit.
Ok
```

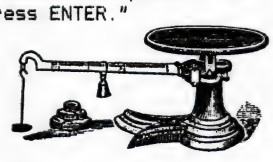
The program is shown below. Note the IF...THEN statement in line 520 and PRINT USING in line 540.

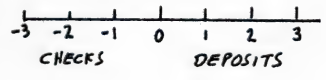
```
1 REM ** World's Most Expensive Checkbook Balancer **
2 ' Your BASIC Backpack #10  3/17/88
3 ' Microsoft GW-BASIC  File: CALCULTR.003

100 REM ** Set up the screen **
110 SCREEN 0: CLS: KEY OFF: WIDTH 80
200 REM ** Print the date and time **
210 PRINT "The date is "; DATE$
220 PRINT "The time is "; TIME$
300 REM ** Tell what to do **
310 PRINT "I will help you balance your checkbook."
320 PRINT "Enter a check as a negative number and press ENTER."
330 PRINT "Enter a deposit as a positive number and press ENTER."
340 PRINT "To quit, enter zero (0) and press ENTER."
350 PRINT

400 REM ** Get the old balance **
410 INPUT "Old balance"; Balance
420 PRINT

500 REM ** Get checks & deposits, add to total, print new balance **
510 INPUT "Check or deposit"; CheckOrDeposit
520 IF CheckOrDeposit = 0 THEN END
530 Balance = Balance + CheckOrDeposit
540 PRINT "The new balance is       ";
550 PRINT USING "######## ##"; Balance
560 PRINT: GOTO 510
```





The IF...THEN statement in line 520 ends the program if the value of CheckOrDeposit is zero (0).

```
520 IF CheckOrDeposit = 0 THEN END
```

If this is true, then do this

If the value of CheckOrDeposit is not zero, the computer ignores the THEN clause and goes on to line 530. The program does not END.

```
520 IF CheckOrDeposit = 0 THEN END
```

If this is not true, then don't do this

Value of Stocks, Revisited

In "Your BASIC Backpack # 8," we showed you a program to compute the value of stocks, given the number of shares and the price per share entered from the keyboard. Here is an improved version that lets you end the program by entering zero (0) as the number of shares. The computer then prints the total value of all stocks entered. First, a sample run.

```
The date is 03-17-1988
The time is 13:43:00

Number of shares? 1
Price per share ? 1.375
The value of these shares is          $1.38

Number of shares? 1000
Price per share ? 29.75
The value of these shares is      $29,750.00

Number of shares? 200
Price per share ? 67.128
The value of these shares is      $13,425.60

Number of shares? 0
The total value is                $43,176.98
Ok
```

The program uses **double-precision variables** to accomodate you high rollers. (Or would that be deep plungers?) Double-precision numbers can have up to 16 digits. To do this, we put a number sign at the end of a variable to specify double-precision (NumberOfShares#, Value#, etc.).

Each computed value is rounded to the nearest cent and all values are printed as dollars and cents. An IF...THEN statement detects the zero shares condition and sends the computer to Block 700 to print the total value of all stocks.

Note that the total value of all shares is set to zero in Block 300. This, of course, is like clearing a calculator. When you enter the first pair of numbers (shares and price), the computer computes the value and adds it to the total value, originally zero. This is the first sub-total. Each new stock value is added, thus keeping a running total inside the computer. When you enter zero, the computer prints its up-to-date total, the grand value of your portfolio. Well, we hope you think it is grand.

```
1 REM ** Value of Stocks **
2 ' Your BASIC Backpack #10  3/17/88
3 ' Microsoft GW-BASIC  File: STOCKS.002

100 REM ** Set up the screen **
110 SCREEN 0: CLS: KEY OFF: WIDTH 80

200 REM ** Print the date and time **
210 PRINT "The date is "; DATE$
220 PRINT "The time is "; TIME$

300 REM ** Set the total value of all shares to zero **
310 TotalValue# = 0

400 REM ** Get number of shares & price per share **
410 INPUT "Number of shares"; NumberOfShares#
420 IF NumberOfShares# = 0 THEN GOTO 710
430 INPUT "Price per share "; PricePerShare#

500 REM ** Compute value and add to total value **
510 Value# = NumberOfShares# * PricePerShare#
520 Value# = INT(100 * Value# + .5) / 100      'Round to cents
530 TotalValue# = TotalValue# + Value#

600 REM ** Print value of these shares & go for more **
610 PRINT "The value of these shares is ";
620 PRINT USING "$$##########,.##"; Value#
630 PRINT: GOTO 410

700 REM ** Print Total value of all stocks **
710 PRINT
720 PRINT "The total value is           ";
730 PRINT USING "$$##########,.##"; TotalValue#
740 END
```

The PRINT USING statements in lines 620 and 730 tell the computer to print numbers as dollars and cents with commas in the right places. In the sample run, note that the decimal points are lined up vertically.

Double-precision variable

```
PRINT USING "$$##########,.##"; TotalValue#
```

Print a dollar sign. Print up to 9 digits with commas. Print a decimal point followed by two digits.

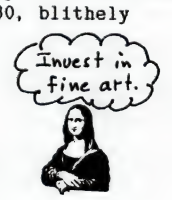
The above PRINT USING statement allows numbers up to $999,999,999.99, which easily takes care of our portfolio. If you want to print numbers the size of the U.S. National Debt, put more number signs (#) to the left of the comma and decimal point (,.).

To end the program, you enter zero (0) for the number of shares. This is detected by the IF...THEN statement in line 420.

```
420 IF NumberOfShares# = 0 THEN GOTO 710
```

If this is true, then do this.

If the number of shares is zero, the computer goes to line 710, prints the total value of all shares previously entered, then stops. If the number of shares is not zero, the computer goes on to line 430, blithely assuming there is more work to be done.




```
420 IF NumberOfShares# = 0 THEN GOTO 710
```

If this is not true, then don't do this.

continued on page 263

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You can write line 420 in a shorter way, using an "implied" GOTO.

```
420 IF NumberOfShares# = 0 THEN 710
```

It is ok to omit the keyword, GOTO.

Homework: Read about IF...THEN and PRINT USING in your BASIC Reference Manual. If you still have the September, 1987 issue of COMPUTER SHOPPER, turn to "Your BASIC Backpack" and read the short section called NEGATIVE, ZERO, OR POSITIVE. It's on page 174.

Modify the check balancing program so that, at the end of the program, the total of all checks, and the total of all deposits are printed.

```
    .
    .
    .
Check or deposit? 16.23
The new balance is              426.90

Check or deposit? -5.95
The new balance is              420.95

Check or deposit? 0

The total of all checks is     -123.45
The total of all deposits is    367.23
Ok
```

The People's Poll

Elections are coming on. Time to take a poll. Here is our questionnaire.

> Who do you like for president in 1988? Circle the number to the left of the candidate of your choice.
>
> 1. Snoopy
> 2. Red Baron
> 3. Lucy
> 4. None of the above.

We asked 37 people, collected the questionnaires, then used our trusty computer to tally the opinions, as shown below.

```
The date is 03-17-1988
The time is 14:46:31

Valid votes are the numbers 1, 2, 3, and 4.

Type a vote and press the ENTER key.

To quit, type 0 (zero) and press the ENTER key.

Vote? 3                         A vote for Lucy

Vote? 3                         Another vote for Lucy

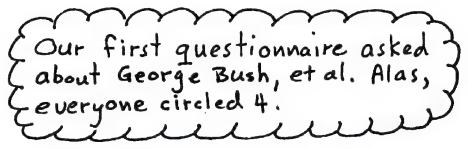
Vote? 1                         A vote for Snoopy

Vote? 5
Oops! Invalid vote. Try again.

Vote? 2                         Curses! A Red Baron fan

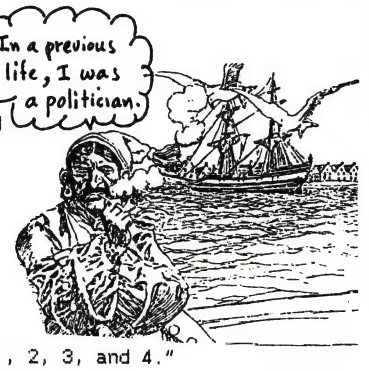
Vote? 4                         None of the above
   .
   .                            and so on for 37 votes
   .
Vote? 0

Votes for Snoopy:     10
Votes for Red Baron:   7
Votes for Lucy:       16
None of the above:     4
Total of all votes:   37
Ok
_
```



Try rewriting Block 700 of the program so the numbers line up the way you want them to line up.

Here is our first program. But remember, there is always another way to do it. Try it. To save time, you can omit Block 1, Block 200, and all the REMs.




```
1 REM ** The People's Poll **
2 ' Your BASIC Backpack #10  3/17/88
3 ' Microsoft GW-BASIC  File: SURVEY.001

100 REM ** Set up the screen **
110 SCREEN 0: CLS: KEY OFF: WIDTH 80

200 REM ** Print the date and time **
210 PRINT "The date is "; DATE$
220 PRINT "The time is "; TIME$
230 PRINT

300 REM ** Tell what to do **
310 PRINT "Valid votes are the numbers 1, 2, 3, and 4."
320 PRINT
330 PRINT "Type a vote and press the ENTER key."
340 PRINT
350 PRINT "To quit, type 0 (zero) and press the ENTER key."

400 REM ** Set total to zero for each valid vote **
410 Snoopy = 0
420 RedBaron = 0
430 Lucy = 0
440 NoneAbove = 0

500 REM ** Get a vote. Test for end of program & validity **
510 PRINT
520 INPUT "Vote"; vote
530 IF vote = 0 THEN GOTO 710
540 IF vote = INT(vote) AND vote >= 1 AND vote <= 4 THEN 610
550 PRINT "Oops! Invalid vote. Try again.": GOTO 510

600 REM ** Update vote totals and go back for more **
610 IF vote = 1 THEN Snoopy = Snoopy + 1
620 IF vote = 2 THEN RedBaron = RedBaron + 1
630 IF vote = 3 THEN Lucy = Lucy + 1
640 IF vote = 4 THEN NoneAbove = NoneAbove + 1
650 GOTO 510

700 REM ** Print vote totals **
710 PRINT
720 PRINT "Votes for Snoopy:    "; Snoopy
730 PRINT "Votes for Red Baron:"; RedBaron
740 PRINT "Votes for Lucy:      "; Lucy
750 PRINT "None of the above:   "; NoneAbove
760 TotalVotes = Snoopy + RedBaron + Lucy + NoneAbove
770 PRINT "Total of all votes: "; TotalVotes
780 END
```

Zappy Artist Makes Lightning

"Watch!" exclaimed Zappy. "I'll make lightning on the screen. Imagine that the top line of the screen is the sky and the bottom line is the ground. I'll make lightning zap from sky to ground."

And so he did, then handed us a disk and bolted out the door. Of course, we listed the program. Here it is.

```
1 REM ** Zappy Artist Makes Lightning **
2 ' Your BASIC Backpack #10  3/17/88
3 ' Microsoft GW-BASIC  File: ZAPPYART.006

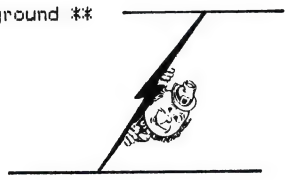
100 REM ** Set-up screen & scramble random number generator **
110 SCREEN 1: CLS: KEY OFF
120 RANDOMIZE TIMER

200 REM ** Pick random color, lightning source & destination **
210 sky = 320 * RND
220 ground = 320 * RND
230 kolor = 3 * RND + 1

300 REM ** Make lightning bolt from sky to ground **
310 LINE (sky, 0) - (ground, 199), kolor

400 REM ** Erase lightning bolt **
410 LINE (sky, 0) - (ground, 199), 0

500 REM ** Go do it again **
510 GOTO 210
```



This program makes fast lightning, briefly seen. You can make each bolt last longer by putting a FOR...NEXT delay loop in line 320.

- Add this line: `320 FOR kk = 1 to 100: NEXT kk`

These bolts come real fast without much time between bolts. You can change that by adding another time delay in line 420.

- Add this line: `420 FOR kk = 1 TO 1000: NEXT kk`

Instead of 1 TO 100 and 1 TO 1000, you pick the numbers in the FOR...NEXT loops.

You can tell the computer to select at random either of the sets of colors in SCREEN 1.

- Add this line: `250 COLOR 1, 2 * RND`

But, where's the thunder? Use the SOUND statement to add thunder.

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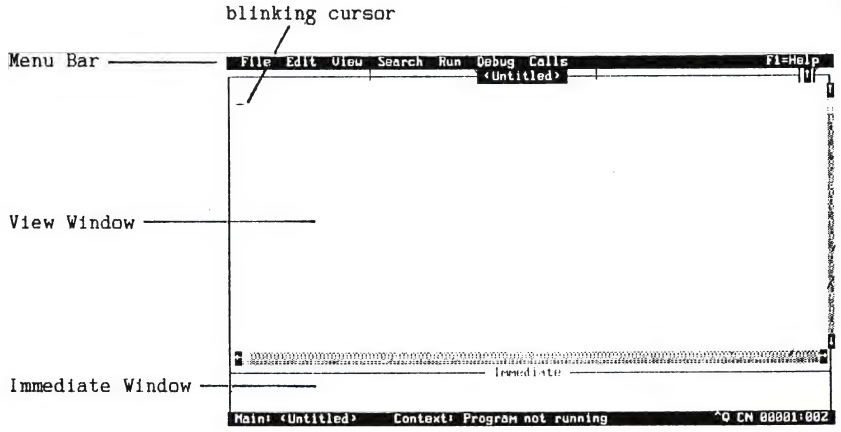
Teach Yourself QuickBASIC

This section began in Your BASIC Backpack #8. We assume that you have made some QuickBASIC Work Disks and know how to load QB into the computer and be rewarded by the sight of the QuickBASIC opening screen shown below.



We call this screen **QB Control**. It is well-described on pages 66 and 67 of the book **Learning and Using QuickBASIC** that comes in the QB package.

For your first QuickBASIC program we suggest a program to print the date, time, and your name. While gazing at the above screen, George Firedrake typed:

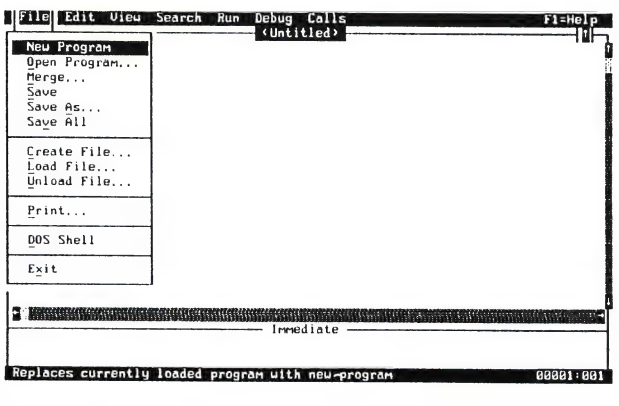
```
CLS
PRINT DATE$
PRINT TIME$
PRINT "George Firedrake"
-
```

George's program appeared in the View Window as he typed it.

If you type cls in lower case, QuickBASIC will change it to upper case when you press ENTER. The same for print, date$, and time$. These are BASIC keywords. Type them any old way (but spell them correctly), and QB will format them as all caps. That's the way we want it, anyway. Thanks, QB.

We think it is a real good idea to immediately save a program, even before you use it, print it, or otherwise it. To save a program, use the File Menu. Here's how.

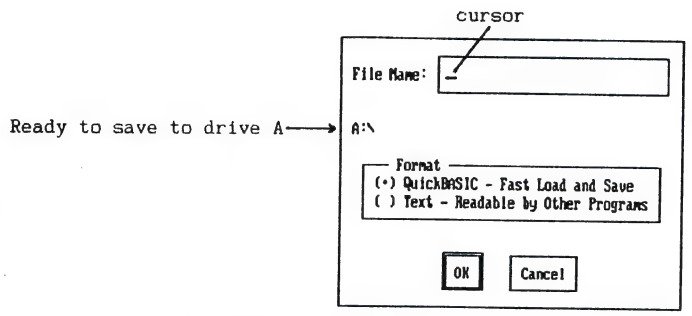
- Press the ALT key, then press the F key. The File Menu "drops down."



Look for the File Menu on pages 68 and 86 of **Learning and Using Microsoft QuickBASIC**. You will use the File Menu a lot!

In the File Menu, the top selection (New Program) is highlighted. Use the down arrow key (↓) to move the highlight down to Save AS... . If you go too far, you can use the up arrow key (↑) to move the highlight up the File Menu.

- When Save As... is highlighted, press the ENTER key. The Save As... Dialog Box pops into view.



Read about the Save As... Dialog Box on page 93 of **Learning and Using Microsoft QuickBASIC**.

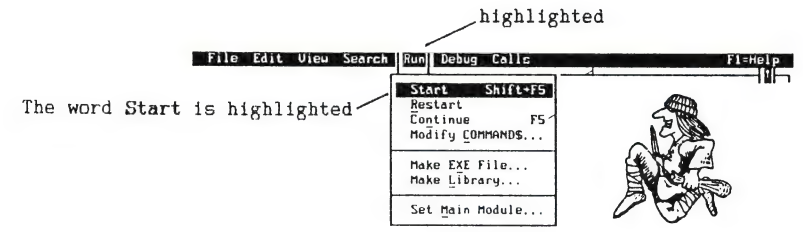
Note the cursor blinking in the File Name Box. If you now type a file name for your program and press the ENTER key, the program will be saved on disk drive A. Go ahead. Do it.

- We typed QBDEMO.001 and pressed ENTER.

The disk drive light came on, the disk drive clicked a little, and the Save As... Dialog Box disappeared. We are back in QB Control. However, there is a small change. In the top middle of the screen, we see the name we gave the program: QBDEMO.001.

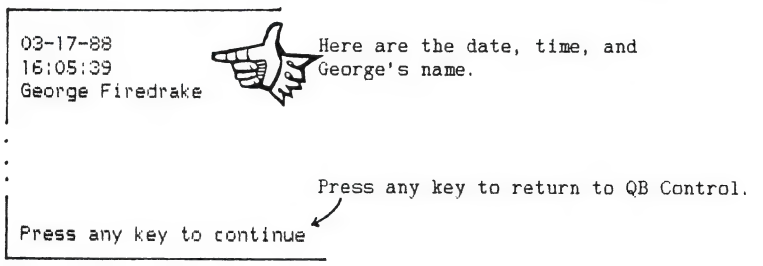
The program, now called QBDEMO.001, is stored on the QB Work Disk. Later, we'll go get it. But now, let's run the program.

- Press the ALT key, then press the R key. This highlights the word **Run** in the Menu Bar and also selects the Run Menu.



Ready to run? Do it.

- Press the ENTER key to run the program. Here is what we saw:


03-17-88
16:05:39
George Firedrake
Here are the date, time, and George's name.
Press any key to return to QB Control.
Press any key to continue

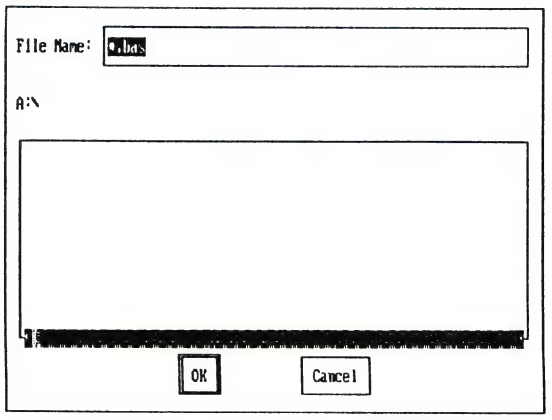
Press any key and you return to QB Control. Your program is still in the View Window. You have created, saved, and run a short program.

Next, erase the program from memory and from the View Window. You can use the New Program selection in the File Menu to do this.

- Press the ALT key, then press the F key. You will see the File Menu with **New Program** highlighted.
- Press the ENTER key. The File Menu disappears and you return to QB Control. The program is gone from the View Window and the title box says: Untitled.

The program is still stored on the disk under the file name QBDEMO.001. Let's use the File Menu to see what is on that disk and then load QBDEMO.001 into memory.

- Press the ALT key, then press the F key to get the File Menu. The highlight is on **New Program**. That's not what we want.
- Press the down arrow key (↓) once. The highlight moves down to **Open Program**. Good! That's what we want.
- Press the ENTER key. You will see the Open Program Dialog Box.



Hmmm... wonder what is on the disk in drive A. Let's find out.

- Type *.* and press the ENTER key.

In the box just under A:\, you will see a list of the files now on the disk in drive A. Our QB Work Disk now has these files:

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```
command.com         Yes, the file names are
qb.exe              shown in lower case,
qb.hlp              even if you typed them
qbdemo.001          in upper case.  That's Ok.
```

Load qbdemo.001 into memory, as follows:

- Type **qbdemo.001** and press the ENTER key. The program is loaded, the dialog box disappears, and the program is shown in the View Window.

Well, we hope all the above happened when you did it. If so, you now know how to:

Create a program in the View Window.
Use the File Menu to save the program to disk drive A.
Use the Run Menu to run the program.
At the end of a run, press any key to return to QB Control.
Use the File Menu to erase a program.
Use the File Menu to list the files on the disk in drive A.
Use the File Menu to load a program from drive A.

★★

BASIC Backpack Pen Pals

Our number one problem-solver is Ed Ayres, who sends us more solutions than we can publish. Others, too numerous to mention, send solutions.

Ed Ayres has agreed to be the point person for **BASIC Backpack Pen Pals.** What is it? Well, we really don't know. We think it might be a way for problem-solvers to exchange information. Or, it might be a way for people with interesting problems to communicate with people who like to solve problems. Or ... what do you think?

Want to play? Want to share problems and/or solutions in GW-BASIC, BASICA, QuickBASIC, Turbo BASIC, True BASIC, and other BASICs? If yes, please send us the following information for us to publish.

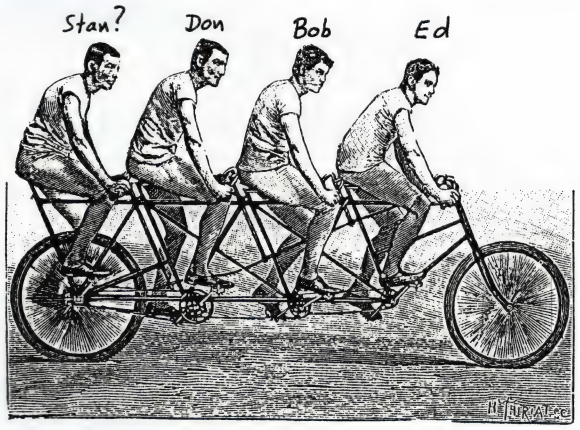
- Your name, address, and anything you wish to say about yourself.
- Your computer and the version of BASIC you use.
- Problems and/or solutions.
- Anything else you think is relevant, useful, inspirational, or ...

Ed already has solutions in True BASIC or QuickBASIC to BASIC Backpack problems 7, 8, 13, 15, 17, 18, 24, 29, and 32. However, we haven't picked up the mail today, so ... Ed's address is:

- Ed Ayres, 929 Massachusetts Ave., #1-H, Cambridge, MA 02139.

If you want a reply, enclose a **self-addressed, stamped envelope.**

If you want to correspond with other problem-solvers, send the information listed above to Your BASIC Backpack, PO Box 7627, Menlo Park, CA 94026.



The Solution Shelf

Let's warm up with the solution to two easy problems from YBB #8.

Problem 30. Big Winner on a TV Show

Congratulations! You are the big winner on a TV show. Your prize is selected as follows:

- A number from 1 to 1000 is chosen at random. Call it N. You then select one, but only one, of the following prizes. You have 60 seconds to make your selection.
- Prize Number 1: You receive N dollars.
- Prize Number 2: You receive $D = 1.01^N$ dollars.

Perhaps you recognize the formula for D. It is the amount received if you invested $1 at 1% interest per day, compounded daily for N days. The question, of course, is: For a given value of N, which prize do you take, Prize Number 1 or Prize Number 2? Here is a program to help you decide.

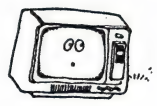
```
1 REM ** Big Winner on a TV Show **
2 ' Your BASIC Backpack #10  3/18/88
3 ' Microsoft GW-BASIC  File: TVSHOW.001

100 REM ** Set up the screen **
110 SCREEN 0: CLS: KEY OFF: WIDTH 80

200 REM ** Get value of n. It is Prize #1 **
210 INPUT "N ="; n
220 Prize1 = n

300 REM ** Compute the value of Prize #2 **
310 Prize2 = 1.01 ^ n

400 REM ** Tell which prize to take & go back **
410 IF Prize1 >= Prize2 THEN PRINT "Take Prize Number 1."
420 IF Prize2 >= Prize1 THEN PRINT "Take Prize Number 2."
430 PRINT: GOTO 210
```



```
N =? 1
Take Prize Number 2

N =? 2
Take Prize Number 1

N =? 600
Take Prize Number 1

N =? 700
Take Prize Number 2

N =? _
```

Prize Number 2 is worth $1.01.

What is the smallest value of N (other than N = 1), for which Prize Number 2 is greater than Prize Number 1? Will Prize Number 2 be greater than Prize Number 1 for all values of N greater than the "crossover" number?

Modify the program so that the computer prints the value of the prize it advises you to take.

Problem 31. How Much is That in Centimeters?

We hope that the U.S. will someday go metric, thus joining the rest of the people on Gaia, who have already gone metric. However, in the meantime, here is a program to compute centimeters, given feet and inches.

```
1 REM ** Convert Feet and Inches to Centimeters **
2 ' Your BASIC Backpack #10  3/18/88
3 ' Microsoft GW-BASIC  File: METRIC.001

100 REM ** Set up the screen **
110 SCREEN 0: CLS: KEY OFF: WIDTH 80

200 REM ** Get feet and inches **
210 INPUT "Feet = "; feet
220 INPUT "Inches "; inches

300 REM ** Compute & print centimeters, go for more **
310 centimeters = 2.54 * (12 * feet + inches)
320 PRINT "Centimeters ="; centimeters
330 PRINT: GOTO 210
```

```
Feet = ? 4
Inches ? 7
Centimeters = 139.7

Feet = ? 3
Inches ? 3
Centimeters = 99.06

Feet = ? 0
Inches ? 1
Centimeters = 2.54

Feet = ? 1
Inches ? 0
Centimeters = 30.48

Feet = ? 3
Inches ? 0
Centimeters = 91.44

Feet = ? 5280
Inches ? 0
Centimeters = 160934.4

Feet = ? _
```

Mariko is about 4' 7" tall.

So, she is about 140 centimeters tall.

R2-D2 is about this tall.

2.54 centimeters in one inch.

30.48 centimeters in one foot.

91.44 centimeters in one yard.

In one mile, about
160934 centimeters, or
1609.34 meters, or 1.60934 kilometers.

Your turn.

Problem 27. Roll 3D6 and Count the Ways

In many role playing games, you create a character by rolling three 6-sided dice (3D6) for each of several characteristics such as strength, intelligence, or dexterity. When you roll 3D6, you get a number from 3 to 18. There is only one way to get 3, three ways to get 4, and so on. Here is a program to "roll" 3D6 in all possible ways and count the number of times each possible value, 3 to 18, occurs. The number of ways to obtain any result is called the **frequency** of that result.

```
1 REM ** Roll 3D6 and Count the Ways **
2 ' Your BASIC Backpack #10  3/19/88
3 ' Microsoft GW-BASIC  File ROLL3D6.001
```

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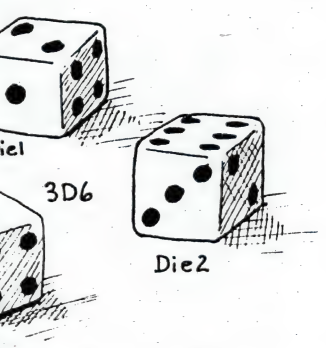
```
100 REM ** Dimension array to hold counts, 3 to 18 **
110 DIM Count(18)
200 REM ** Set up the screen **
210 SCREEN 0: CLS: KEY OFF: WIDTH 80

300 REM ** Set all the counts to zero **
310 FOR k = 0 TO 18
320   Count(k) = 0
330 NEXT k

400 REM ** Roll & count each roll by sum of dice rolled **
410 FOR Die1 = 1 TO 6
420   FOR Die2 = 1 TO 6
430     FOR Die3 = 1 TO 6
440       Roll = Die1 + Die2 + Die3
450       Count(Roll) = Count(Roll) + 1
460     NEXT Die3
470   NEXT Die2
480 NEXT Die1

500 REM ** Print the results **
510 PRINT "Roll", "Frequency"
520 PRINT
530 FOR Roll = 3 TO 18
540   PRINT Roll, Count(Roll)
550 NEXT Roll
599 END
```



The three dice are rolled in Block 400. The values occur in the following order.

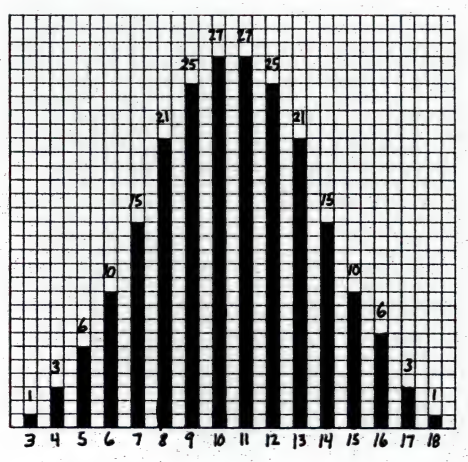
Die1	Die2	Die3	Roll	Line 450 does this:
1	1	1	3	Adds 1 to Count(3)
1	1	2	4	Adds 1 to Count(4)
1	1	3	5	Adds 1 to Count(5)
1	1	4	6	Adds 1 to Count(6)
1	1	5	7	Adds 1 to Count(7)
1	1	6	8	Adds 1 to Count(8)
1	2	1	4	Adds 1 to Count(4)
1	2	2	5	Adds 1 to Count(5)

and so on ...

Block 400 toils mightily, cranking out all 216 possible outcomes and distributing the tallies to Count(3) through Count(18). When all is done, Block 500 prints the totals. Here they are.

Roll	Frequency
3	1
4	3
5	6
6	10
7	15
8	21
9	25
10	27
11	27
12	25
13	21
14	15
15	10
16	6
17	3
18	1

Ok



Problem 28. Roll n Dice, Each with s Sides

Role playing gamers use dice in many shapes: tetrahedra, hexaheadra (cubes), octahedra, dodecahedra, icosahedra, and still others. Here is a subroutine to roll **n**Ds, which game players know means to roll n dice, each with s sides. You supply the line numbers and complete the solution to Problem 28, which appeared in YBB #7.

```
REM ** Subroutine: Roll nDs **
TotalRoll = 0
IF n = 0 OR s = 0 THEN RETURN
FOR roll = 1 TO n
  die = INT(s * RND) + 1
  TotalRoll = TotalRoll + die
NEXT roll
RETURN
```

If you are using QuickBASIC, True BASIC, or Turbo BASIC, rewrite this subroutine as a multiline defined function (DEF...END DEF).

Using this subroutine or defined function, you can modify our program for Problem 27 to roll nDs and count the ways. The way to do it is to create a "dice odometer" with each "wheel" having numbers from 1 to s, and n wheels in all.

Problem 17. Number of Days in a Month

Write a program to compute and print the number of days in a month, given the month (1 to 12) and the year (1582 or later). Here is one way to do it.

```
1 REM ** Number of Days in a Month **
2 ' Your BASIC Backpack #10  3/19/88
3 ' Microsoft GW-BASIC  File: CALENDAR.001

100 REM ** Define days per month array **
110 DIM DaysPerMonth(12)
120 FOR month = 1 TO 12
130   READ DaysPerMonth(month)
140 NEXT month
150 DATA 31, 28, 31, 30, 31, 30, 31, 31, 30, 31, 30, 31

200 REM ** Set up the screen **
210 SCREEN 0: CLS: KEY OFF: WIDTH 80

300 REM ** Get month and year **
310 INPUT "Month (1 to 12)     "; month
320 IF month = INT(month) AND month > 0 AND month < 13 THEN 340
330 BEEP: GOTO 310
340 INPUT "Year (1582 or later)"; year
350 IF year = INT(year) AND year > 1581 THEN 410
360 BEEP: GOTO 340

400 REM ** Get number of days from DaysPerMonth() **
410 NumberOfDays = DaysPerMonth(month)

500 REM ** Add a day if February and a leap year **
510 Leap = (year MOD 4 = 0 AND year MOD 100 <> 0) OR year MOD 400 = 0
520 IF month = 2 AND Leap THEN NumberOfDays = NumberOfDays + 1

600 REM ** Print the number of days & go for more **
610 PRINT "Number of days: "; NumberOfDays
620 PRINT: GOTO 310
```

```
Month (1 to 12)     ? 13
Month (1 to 12)     ? 1
Year (1582 or later)? 1581
Year (1582 or later)? 1582
Number of days:  31

Month (1 to 12)     ? 1
Year (1582 or later)? 88
Year (1582 or later)? 1988
Number of days:  31

Month (1 to 12)     ? 2
Year (1582 or later)? 1988
Number of days:  29

Month (1 to 12)     ? _
```

New Problems

As usual, we begin with easy problems for you beginners. We hope our first easy problem will cheer you on to greater heights.

Problem 37. GO TEAM GO !

Imagine a computer with a giant screen. It's the big game of the season and the computer is firing up the Rooter Club -- building energy to help your team win the game.

Write a program to put GO TEAM GO! on the screen in big letters. First, put GO on the screen. You choose the background and foreground colors. Then put TEAM on the screen. Then put GO! on the screen. The three screens might look like this:

If you wish, make the words blink. After the complete message has been on the screen for a little while, clear the screen and start it again. If your computer allows WIDTH 20, use it. Otherwise, use WIDTH 40.

To build suspense, use a time delay after putting each word on the screen. Add SOUND if you wish. May the better team win!

continued on page 267

BASIC Backpack continued from page 266

Problem 38. Average of a Bunch of Numbers

Write a program to compute the sum and average of a bunch of numbers entered from the keyboard. A run might go like this.

```
I will compute the sum and average of a bunch of numbers.

How many numbers are there? 7

Number? 10
Number? 3
Number? -9
Number? -15
Number? -23
Number? -25
Number? -30

The sum is -89
The average is -12.71429

To do again, press any key
```

Hmmm... why not have the computer count the numbers. To do this, decide on a completely outrageous number to use as a 'flag' to signal 'no more numbers'. The highly unlikely number 1E37 is a good flag.

```
I will compute the sum and average of a bunch of numbers.

When I print 'Number?', you enter a number.

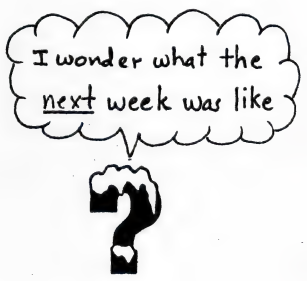
To quit, enter 1E37 as your number.  I will then
print the number of numbers (except for 1E37), their
sum, and their average.

Number? 10
Number? 3
Number? -9
Number? -15
Number? -23
Number? -25
Number? -30
Number? 1E37

You entered 7 numbers.
The sum is -89
The average is -12.71429

To do again, press any key
```

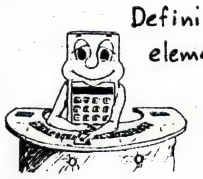
No more numbers



Problem 39. Boggled by Binary

Carlos Baranyai sent us an example of the classic problem of decimal-using people working with a binary-using computer. Here is Carlos's example, slightly edited.

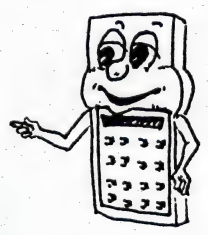
```
10 CLS
20 number = 1
30 FOR k = 1 TO 10
40   PRINT "number ="; number
50   number = number - .1
60 NEXT k
```



Let's see now. The value of **number** is set to 1 in line 20. Then the FOR...NEXT loop prints it, subtracts .1, prints it, subtracts .1, prints it, and so on for 10 times. We expect to see the following values of **number**: 1, .9, .8, .7, .6, .5, .4, .3, .2, .1, 0.

But that's not quite what happens. Let's run it.

```
number = 1
number = .9
number = .8
number = .7
number = .5999999
number = .4999999
number = .3999999
number = .2999999
number = .1999999
number = 9.999992E-02
```



Oops! What's happening here? Experiment. Try this program.

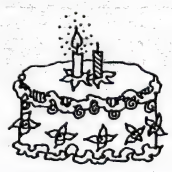
```
10 CLS
20 INPUT "How many .1's"; n
30 number = 0
40 FOR k = 1 to n
50   number = number + .1
60 NEXT k
70 PRINT "The sum of"; n; ".1's is"; number
80 PRINT: GOTO 20
```

1

Here's a sample run.

```
How many .1's? 1000
The sum of 1000 .1's is 99.99904

How many .1's? 10000
The sum of 10000 .1's is 999.9029
```



2

3

```
How many .1's?
```

Ok, out there. Tell our readers about "round-off error."

Problem 40. Print to Screen or Printer

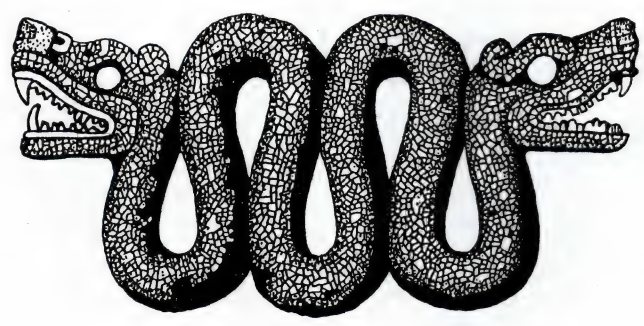
More than two people have asked how to direct a bunch of stuff to either the screen or to the printer without having to write two separate sets of PRINT statements. Complete the following program to demonstrate how to do it.

```
1 REM ** Print to Screen or Printer **
2 ' Your BASIC Backpack #10  3/19/88
3 ' Microsoft GW-BASIC  File: SCRNLPT1.001

100 REM ** Set up the screen **
110 SCREEN 0: CLS: KEY OFF: WIDTH 80

200 REM ** Get information and select device **
210 INPUT "Print to screen (s) or printer (p)"; which$
 .
 .       [You write the rest of this block.]
 .
300 REM ** Print information on selected device **
 .
 .       [You decide what to print and how to do it.]
 .
400 REM ** Tell how to do again **
410 PRINT: PRINT "Press a key to do another";
420 ky$ = INPUT$(1): GOTO 210
```

Hint: Test the value of which$ entered from the keyboard and use an OPEN statement to select the **device** to send the output to. In Block 400, use the PRINT# statement.



Back Issues of YBB

Full-sized (8 1/2 X 11) copies of "Your BASIC Backpack" are available for those of you who missed an episode or two, or don't have hyperscopic eyes. We will make copies and send them to you, as follows:

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This and That

BASIC keeps getting better and better. You can bet on this continuing for a long time. We have written an intermediate level book on the new QuickBASIC 4. Look for it at your favorite purveyor of books: **Using QuickBASIC**, by Don Inman & Bob Albrecht. Don is now busy writing an advanced QB4 book; Bob is chugging away on a QB4 book for beginners who have no previous computer experience.

Any teachers out there? We would love to exchange ideas with teachers about teaching QuickBASIC to kids. We are sharing our materials with 6th and 7th grade students in our neighborhood. We think 11 to 13 is an ideal age for kids to learn how to use the power tools useful on the 20,000,000 MS-DOS computers being used in real life -- the **Volkscomputers.**

We have lots of tutorials, problems, and solutions in our BASIC Backpack. We can invent more. What would you like to see? Send us your comments, suggestions, and requests for stuff you would like us to cover. We'll try to contrive problems, solutions, and tutorials to help you fill your BASIC Backpack with the things you need. Write to Bob & Don, P.O. Box 7627, Menlo Park, CA 94026. If you want a reply, **please enclose a self-addressed, stamped envelope.** In the meantime, pick a problem and solve it.

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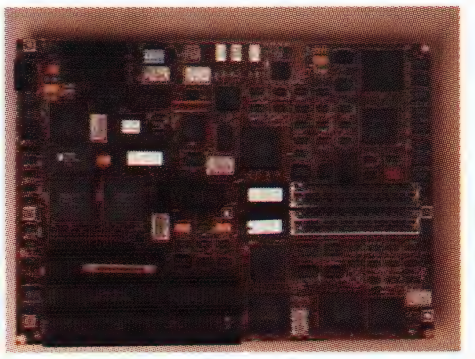

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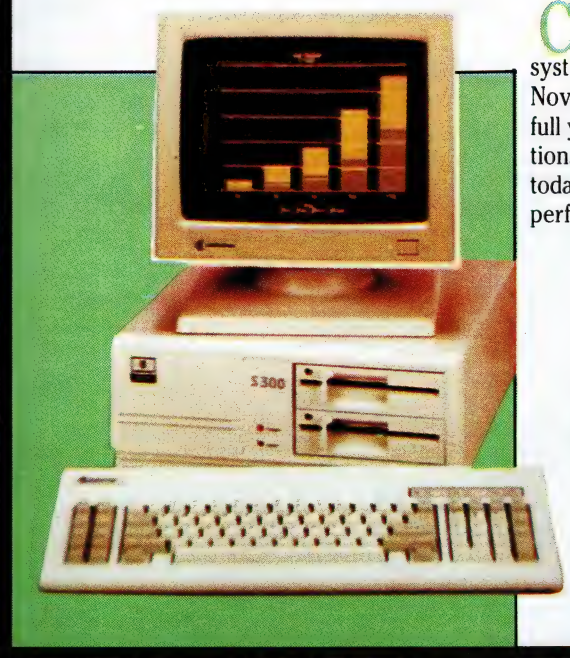

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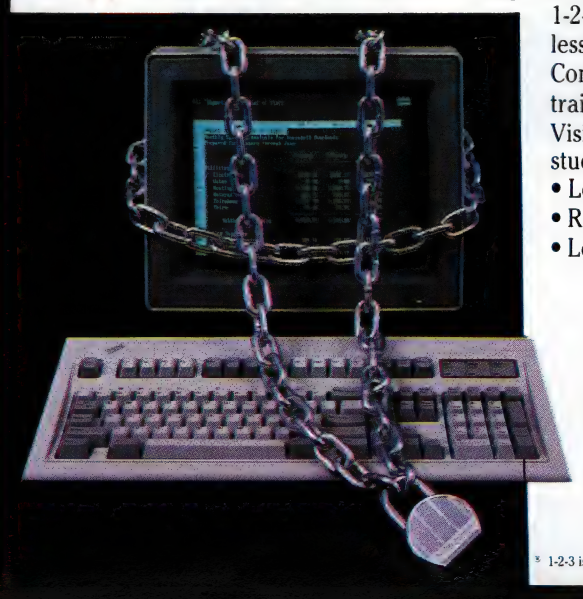

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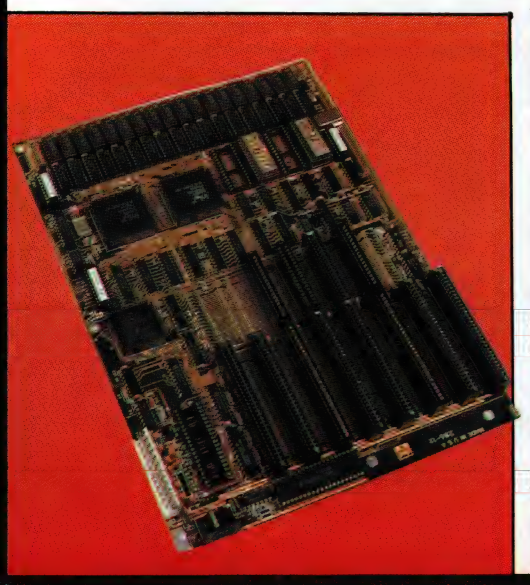

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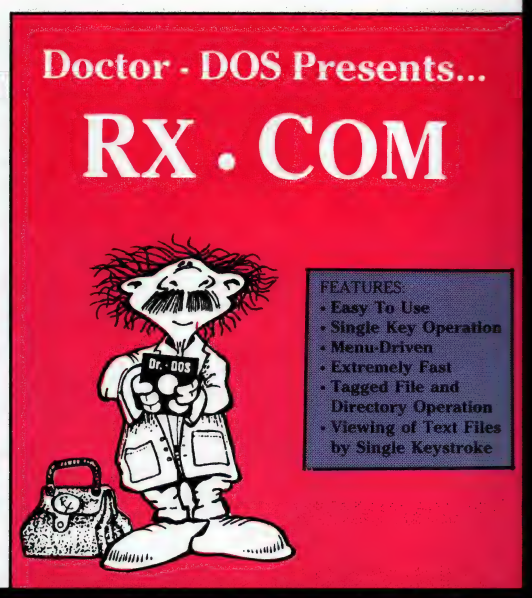

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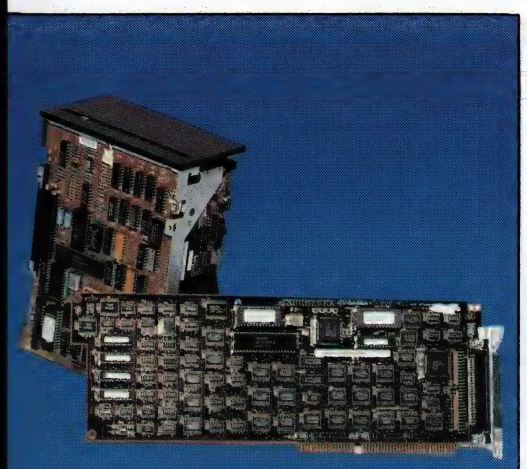

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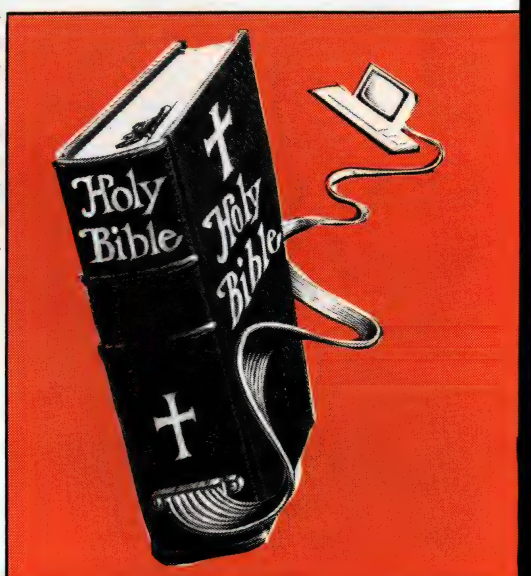

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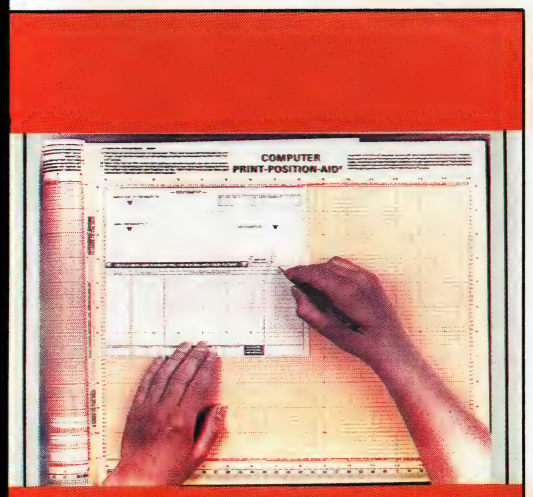

This easy to use Aid consists of 6 transparent 11x15 inch grid overlays accommodating printing needs of 10-12-15 characters per horizontal inch and 6 or 8 lines per vertical inch. These overlays provide PICA spacing and MATRIX printing space bars for 5-6-8.3-16.7-17.1 and 20 C.P.I.

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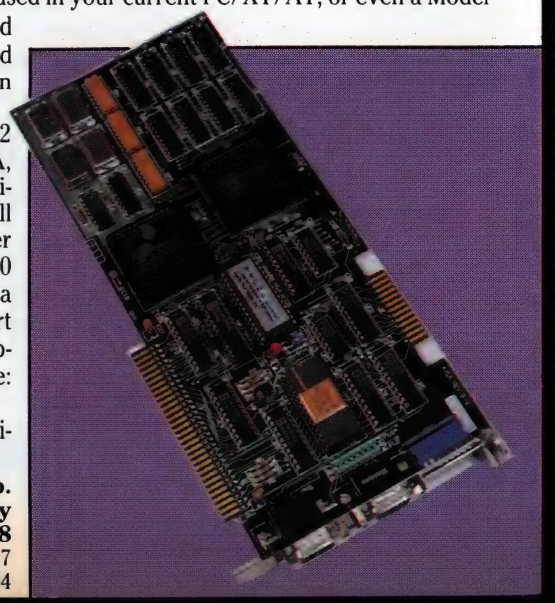

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- Converts IBM Actionwriter (TM) 1/6715 To a Letter-Quality Parrallel Printer
- Easily attaches to back of Actionwriter Typewriter
- Uses standard IBM Parrallel Printer Cable
- Genuine IBM part

$49

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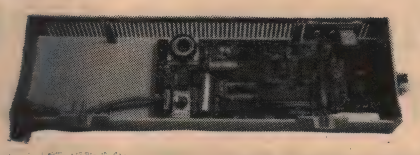
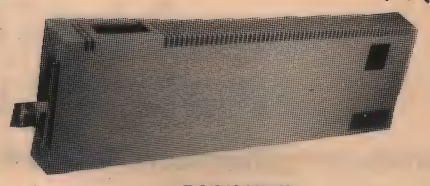
Part No. 220-506



FRONT VIEW



BACK VIEW

PC KEYBOARD 5150

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IBM* Plug Compatible
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80 Track 48 TPI
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Allows speech recording and playback
Provides prerecorded vocabulary
Easy to install
Sidecar Unit attaches to side of PCjr
196 prerecorded words and sounds

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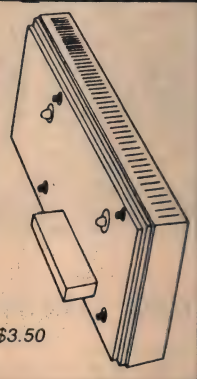

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Heavy Plastic With Combination Lock

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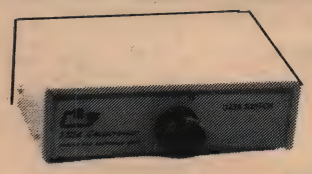

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EPSON dot matrix LCD module
80 columns x 4 lines
Single "+5V" power supply
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Built-in RAM for display data storage

Multiple instruction set
(based on 13 commands)

Built-in C-MOS LCD driver & controller
Easy "Microprocessor" interface
Low power consumption
5x7 dot matrix format with cursor, alphanumerics & special symbols
96 ASCII CHARACTER GENERATOR (plus 64 katakana)
Physical size: 11.535 "x 3.15" x 1.22" 15.9oz.

Part No. 220-006
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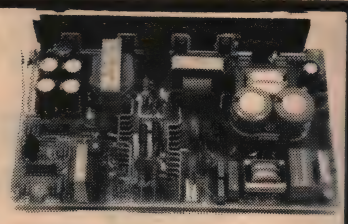

MODEL #	SIZE	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	PRICE
500-002	8¾x5½x2¼"	+12V 1.2A 0.2A to 1.2A	+5V 4A 1.0A to 4.0A	-12V .2A	N/A	$15.95
500-004	8¾x4¾x2¼"	+5V 8A 2.0A to 8.0A	+12V .5A 0.03A to 0.5A	-12V .2A 0.00A to 0.2A	+24V 2A 0.5A to 2.0A	$18.85
500-006	7⅞x4¾x2¼"	+5V 7A 3.0A to 7.0A	+12A 3A 0.75A to 3.0A	-5V .3A 0.0A to 0.3A	-12V .25A 0.0A to 0.025A	$23.95
500-008	8½x5x2½"	+5V 10A	+12V 4.1A	-5V .3A	-12V .5A	$24.95

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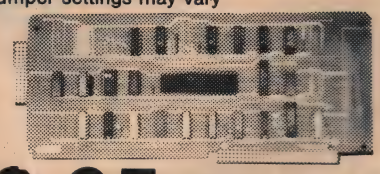
FARADAY FLOPPY DISK CONTROLLER

- Faraday FE5 140
- IBM PC* Plug Compatible
- Controls 1 to 4 Drives
- Includes Cable for 2 half ht. drives
- Does not use IBM cable with twist
- Disk jumper settings may vary



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Part No. #220-104

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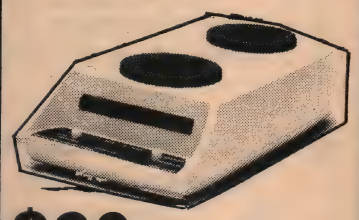
300 Baud
Acoustic
Originate Only



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(used, tested)
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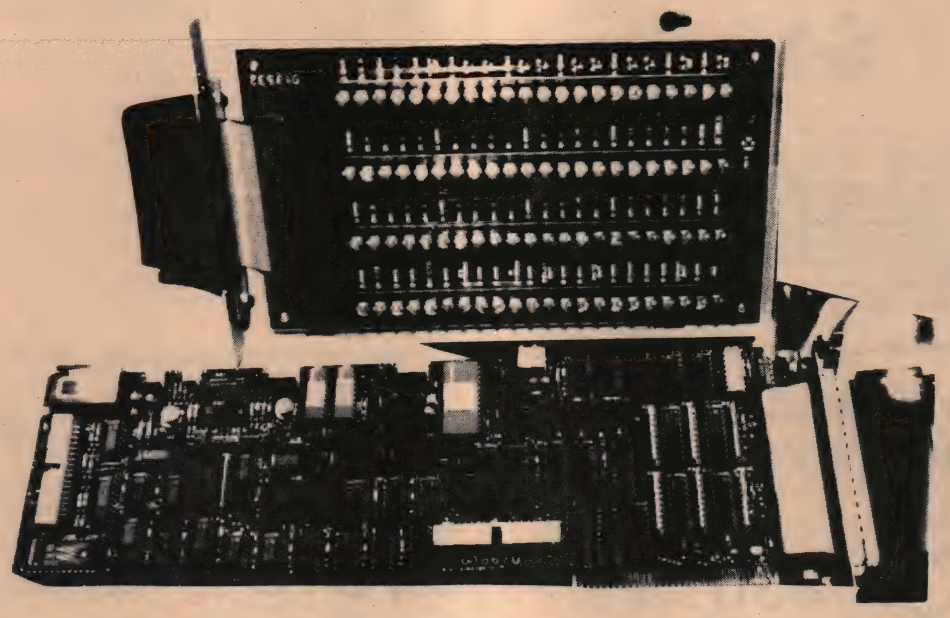
CONTROL YOUR HOME OR BUSINESS FROM YOUR IBM*PC OR PC/AT COMPATIBLE!

This card is what you need to TURN ON & OFF lights, machinery, and other electrical or electronic equipment.

IBM PC* DATA ACQUISITION AND CONTROL ADAPTER & DISTRIBUTION PANEL provides the capability to control and monitor processes within a sensor base system.



IBM PC*DATA ACQUISITION AND CONTROL ADAPTER provides an easy to use interface for accessing the ANALOG and DIGITAL I/O. Integrates analog, binary and time/ counter devices on a single adapter card.

Part No. #220-100 Board

THIS IS AN ORIGINAL IBM* PRODUCT ! ! !

Up to four IBM DATA ACQUISITION AND CONTROL ADAPTERS can be attached to an individual PC or AT Compatible.

- The Adapter has:
  - Four analog input channels (12-bit resolution)
  - Two analog output channels (12-bit resolution)
  - 16-channel digital input port
  - 16-channel digital output port
  - Programmable sampling rates provided by a 32-bit timer
  - Event counter, programmable rate generator, or programmable time delay provided by a 16-bit user timer/ counter

- The Distribution Panel has:
  - Screw terminals provided to attach devices to the distribution panel
  - Multiple grounds for twisted pair terminations
  - Shielded construction to minimize noise interference.

• USES

Chromatography, Electrochemistry, Energy management, Electronic testing, Process control, Data logging, Robotics.

Some parameters commonly monitored or controlled include: Pressure, Flow, Displacement, Voltage, Light intensity, Rotational speed.

Some instruments or devices that may utilize the Adapter are: Chromatographs, Spectrophotometers, Pressure gages, Relay controls, Thermocouples, Gas analyzers, Humidity sensors, Valve actuators, Level gauges, Load cells, Conductivity cells, ph Meters.

• TECHNICAL DATA

ANALOG INPUT: The analog input functions of the adapter operate in eigher programed or interrupting mode. The analog input functions provide 12-bit relative accuracy.

RESOLUTION - 12 bits
INPUT CHANNELS- four differential

INPUT MODES-	unipolar or bipolr, user-selectable
INPUT RANGES:	
unipolar	0 TO ±10 volts, user-selectable
bipolar	±5 and ±10 volts user-selectable
OUTPUT MODE:	
unipolar	straight binary
bipolar	offset binary
INPUT IMPEDANCE	>100 megohms with 100 picofarads
INPUT CURRENT	limited to less than ±4 mA
INPUT VOLTAGE:	
Normal mode	±30 volts maximum, without damage, power on or power off
Common mode	±11 volts maximum
COMMON MODE	
Rejection ratio	72 db
Integral linearity error	±1 LSB maximum
DIFFERENTIAL Linearity	
Error	± ½ LSB maximum
Stability	±5 ppm/degrees C of FSR (max)
GAIN:	
Error	±0.1% between ranges (max) any range adjustable to 0
Stability	±32 ppm/degrees C of FSR (max)
OFFSET:	
Error	adjustable to 0
Unipolar stability	±24 ppm/degrees C of FSR (max)
Bipolar stability	±24 ppm/degrees C of FSR (max)
MONOTONICIITY	0 to 50 degrees C
THROUGHPUT to memory	15,000 conversions/second min.

The analog output functions of the adapter operate in programed I/O mode. The analog output functions provide 12-bit relative accuracy.

RESOLUTION	12-bits
Number of output channels	2
OUTPUT modes	unipolar or bipolar, user-selectable
OUTPUT ranges:	
Unipolar	0 to ±10 volts, user-selectable
Bipolar	±5 and ± + 10 volts, user-selectable
INPUT CODE:	
Unipolar	straight binary
Bipolar	offset binary
OUTPUT Current	+5 milliamps, min. with normal loading and protection from damage with the output shorted to common.
OUTPUT Impedance	2 ohm, max.
CAPACITIVE loading	0.5 microfarads, max.
GAIN:	
Error	0.1 betweem ranges (max.), any range adjustable to 0
Stability	± ppm/degrees C of FSR(max)
OFFSET:	
Error unipolar	±3.25 millivolt max.
Error bipolar	adjustable to 0
Unipolar stability	±8 ppm/degrees C of FSR (max)
Bipolar stability	±24 ppm/degrees C or FSR (max)
MONOTONICITY	0 to 50 degrees C
SETTLING TIME	10 microseconds max. to within 0.1% FSR for a 10 volt step with 1000 of load
PROTECTION	Protected for short to common
OVERSHOOT	±1% of FSR max
THROUGHPUT from memory	25,000 conversion/second

OUR LOW! LOW! PRICE FOR BOTH UNITS

ADDITIONAL DAC DISTRIBUTION PANEL AVAILABLE SEPARATELY
Part No. 220-101
Shipping and Handling $6.50
$60 EA.

$195

INCLUDES TURBO PASCAL DEMO SOFTWARE W/SOURCE CODES, ADDRESSES, ANALOG & BINARY INPUT & OUTPUT MODULES

PER SET

Shipping & Handling $6.50

IBM* DATA ACQUISTION AND CONTROL ADAPTER
#6451502 ORIGINAL COST $1275

IBM* ADAPTER DISTRIBUTION PANEL
#6451504 ORIGINAL COST $245

MENDELSON'S ADVANCED DEMO IN TURBO PASCAL AVAILABLE FOR $25 Part No. #200-108 Demo Turbo

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- Made by Cherry
- Super Enhanced
- 116 Keys
- Num lock, cap lock, scroll lock leds
- XT/AT Switchable

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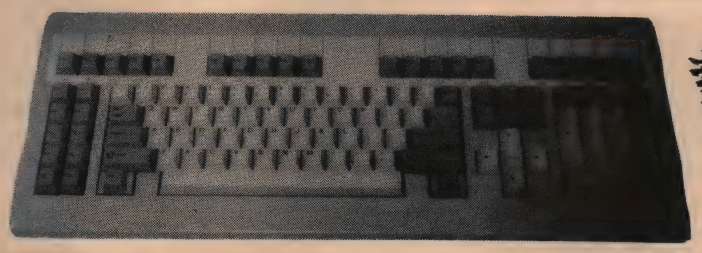

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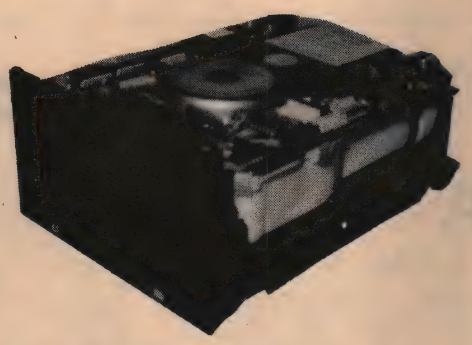
ATASI 3046 HARD DRIVE

- 39 MB (33 MS)
- Full Height
- Beige or Black Face Plate
- **Used, tested (30 Day Guarantee)**

$250 ea.



Shipping & Handling $6.50 ea.
Part No. #220-406

NEW!

NEC 5126H HARD DRIVE

- 20 MB
- High Speed (40 MS)
- 5¼" ½ HT

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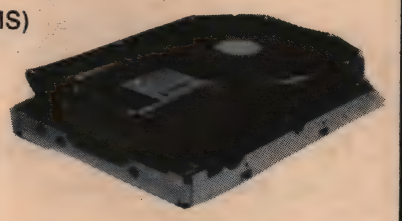

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- Uses IBM PC LAN* or NOVELL NETWARE* Software
- Interoperates with IBM PC® Token Ring Netware
- Operates in 8 bit bus
- Supports 2 to 260 PC's on one Law Ring
- 4 Million bits per second transfer rate
- Uses IBM* standard cabling
- Can be used with diskless models

NEW!

$350 ea.

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TAPE BACK-UP DRIVE

- **IRWIN MODEL 125**
- For use with 286 or 386 machines only
- Connects to FD-HD controller as "B" Drive
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- Low power requirements (15.75 watts)
- Fits into STD ½ height 5¼" drive slot
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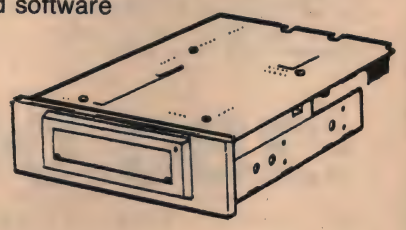

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2/3 HEIGHT FLOPPY DISK DRIVE

- **REMEX Model RFD 480**
- 360K DSDD
- IBM PC* Compatible
- Used tested (30 day guarantee)

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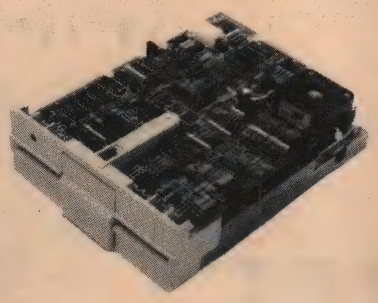

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DOS/COAX 3278/79
IRMA COMPATIBLE

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- Direct high-speed link to 3270 networks.
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- Operates with both channel attached and remote Bisync or SNA/SDLC linked controllers.
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- For PC, XT, AT

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For six years, PO HAI International Corporation has been devoted to quality computer case manufacturing in Taiwan. In this short time, our business has grown from 10 K to 600 K cases annually. For providing better service to our USA customers PO HAI has set up the first distributing center in West Coast in September 1987 and this March (1988) PO HAI's East Coast distributing center has been established as well. We would like to thank all of our American customers for helping us to make PO HAI International Corp. one of the largest computer case supplier in USA. Also, we would like to extend our invitation to all computer OEM manufacturers and dealers to give us a try.

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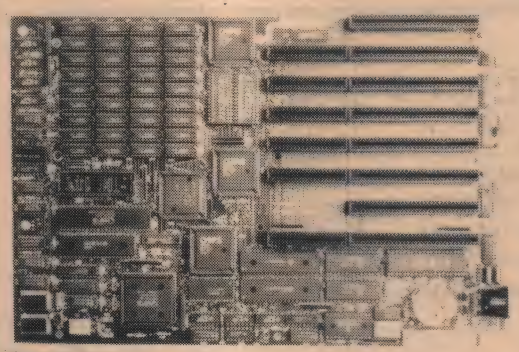
Po Hai
IT 286SB
Baby AT Mother Board

Finally, The Obvious Choice

If "Baby" can do it all why "Big Blue Fellow"

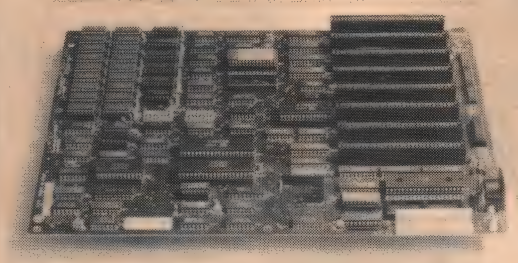


$280.00

The lowest price for you to get A 12 MHz/O-W-S S1 Test 15.3 AT Board

Po Hai
PHK 88-1
10 MHz XT Mother Board

It was called "Ugly Duck"



$66.00

1 YEAR LIMIT WARRANTY PARTS & LABOR

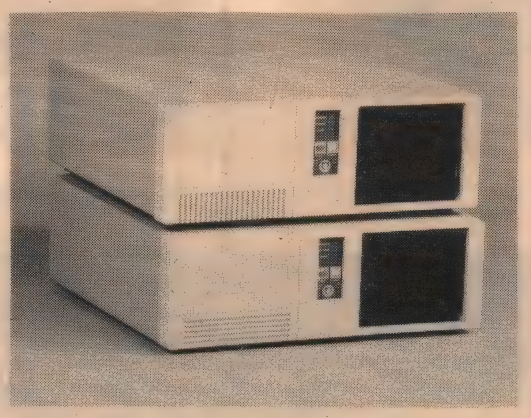
There are over 20 kinds of cases in one shop and here are some of the hot items for today's market.

PH-51A
Tower Case 386/AT/BABY AT

$180.00

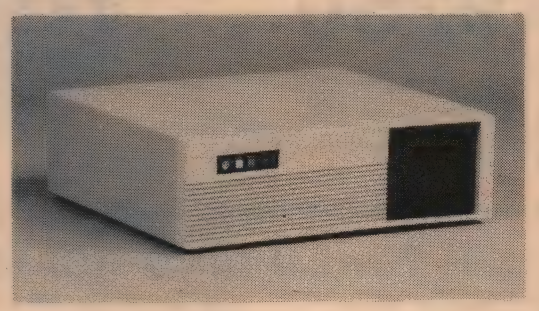
PH-21A
for BABY AT/XT

PH-22A
for BABY AT/XT



$42.00

PH-31A for BABY AT/XT



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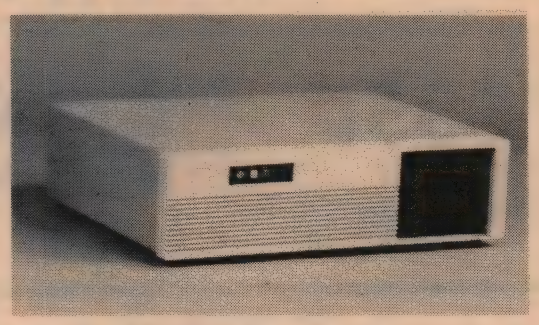
PH-16A for AT/BABY AT



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PH-06A/06-1 for XT

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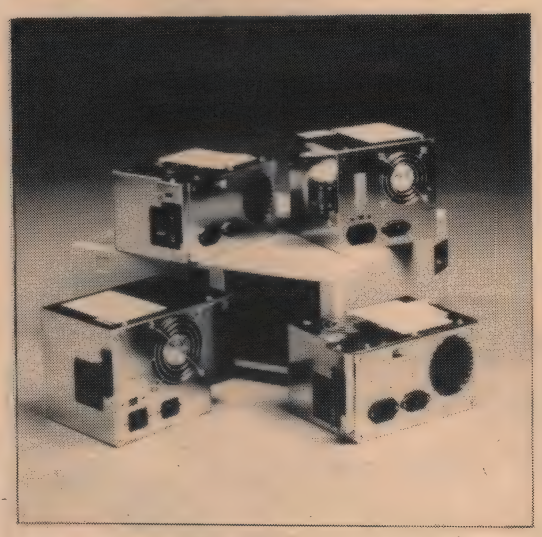
High quality power supplies to fit in all kind of cases UL & FCC approval



PH-4150 150W XT **$38.00**

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- PH-6A Cases
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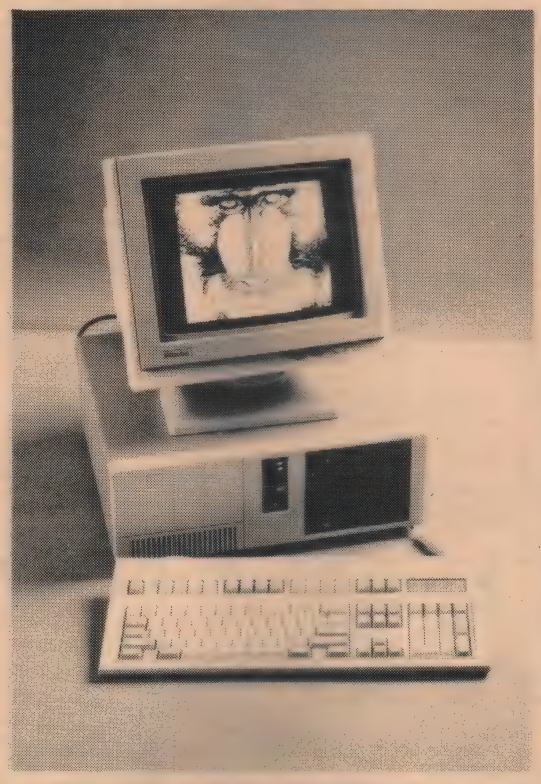

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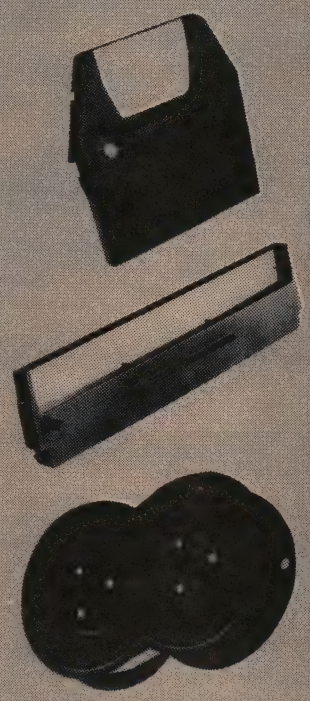

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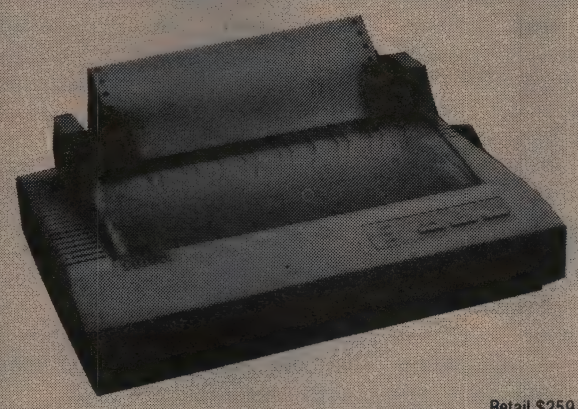

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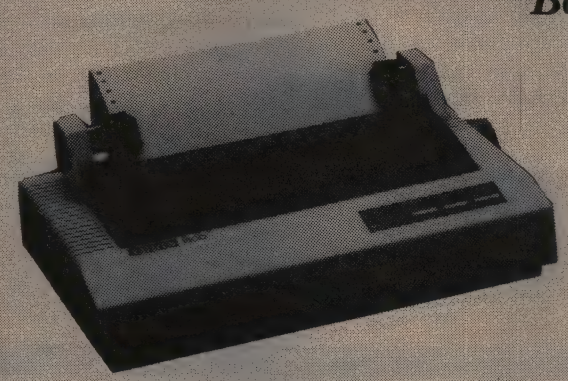

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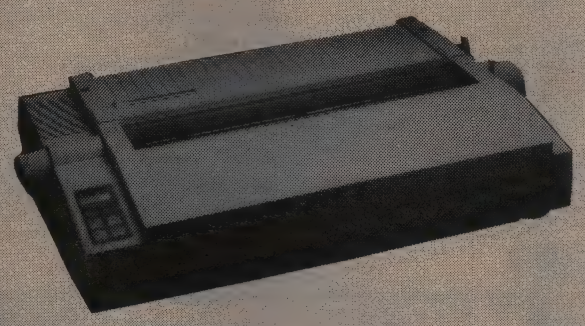

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Programming Watson
continued from page 181

45 minutes of high-quality (low compression) for 10 megabytes of disk space. On our system, we decided that the outgoing messages had to be of "low compression" (of the highest voice quality but also consuming the most disk space) and that incoming messages would be of "high compression (tolerable voice quality but taking up little disk space).

After installation, setting up your Watson VIS is a simple matter of setting up a series of "cards" for each of several files. Watson has separate files for a phone book (to maintain a personal directory of names and phone numbers which can be used for outgoing message delivery), an outgoing message file (most important for our particular system), an incoming message file (a new card is added every time a caller leaves a message), a calendar file (to create and maintain an appointment diary) and a dictation file. Each card in the files has 5 fields of information. The first is the time/date field. It is only used when there is to be a timed "dial and deliver" sequence—for instance, in telemarketing. For example, you can have Watson "wake up" at 6:00 PM and start a sequence to dial a set series of phone numbers, deliver a series of messages controlled by the recipient of the call and record their responses. Since our strategy was for incoming calls, this field was not used.

The second field is "addressee name" field. For outgoing dialing, it will look for this field in the phone file and use the number to call out from there. For our purposes, this field was used to enter a VIS command for our "answer-only" system. The third field is the "number" field. Again, important for dial-out sequences only. For our purposes we used it as a second command field. The next field is the "ID code" field. You can number your cards here and refer to them in the VIS command language—much like a "GOTO x" command in BASIC. The final field is the "key" field. It allows you to identify which card starts a VIS sequence and which are follow-up cards. For our information delivery system, only the outgoing messages were of significance. If the "file, card and field" terminology sounds like a database, you are right. Watson's VIS is a database with the stored information (digitized voice recordings) accessible through the VIS programming language. Nothing more, nothing less.

Time/Date Field	Addressee/ Command 1 Field	Phone Number/ Command 2 Field	ID Code Field	Key Field
CARD #1	NEXT: ? 1080	NEXT: GOTO 2	1	A
	NEXT: ? 720	NEXT: GOTO 3		
CARD #2	NEXT: JUMP 3			C
CARD #3	NEXT: JUMP 2			C
CARD #4	NEXT: JUMP 1			C
CARD #5	NEXT: TEST 3			C
CARD #6	NEXT: CALL @11900			C
CARD #7	NEXT: HANGUP			C
CARD #8	NEXT: NUMBER 1		11500	C
	NEXT: + 110	NEXT: JUMP @0		
CARD #9	NEXT: JUMP 1			C
CARD #10	NEXT: JUMP 6		111	C
CARD #11	NEXT: JUMP 5		112	C
CARD #12	NEXT: JUMP 4		113	C
CARD #13	NEXT: JUMP 3		114	C
CARD #14	NEXT: JUMP 2		115	C
CARD #15	NEXT: JUMP 1		116	C
CARD #16	NEXT: HANGUP			C
CARD #17	NEXT: RECORD 15		11900	C
CARD #18	NEXT: RECORD 30			C
CARD #19	NEXT: RECORD 20			C
CARD #21	NEXT: CALL RETURN			C

The Healthline Setup

The feature that separates the VIS from the routine Watson is the set of programming instructions added with VIS. With this set of commands, you can sequence your outgoing message file to request and respond to key presses from a touchtone tone and move to set messages based on a series of responses from the caller. The following is a simplified segment of the outgoing message file we set up for the Healthline system and how each card directed the caller's session. Note: the "Card #x" statement is given only for illustration and does not appear on the actual VIS cards. See table this page.

Card #1

Explanation: These commands instruct Watson to check for the number of minutes that have elapsed since the previous midnight. It first checks to see if it has been more than 18 hours (1080 minutes or after 6:00 PM). If so, it jumps two cards (to card #3). If it has not been 1080 minutes or more, it next asks if it has been greater that 720 (12:00

continued on page 281

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Color Graphic w/Print Port	48	44	40
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EasyFlow
continued from page 181

use DOS commands if it turns you on. For the most part this could have been left out of the program with out any great loss.

The Utilities Option provides for screen configuration if you need it, Batch Printing to print a number of charts (while you are off eating dinner), A Mouse Speed Adjustment and a Color Adjustment if you have a color monitor. Each of the options is pretty much self explanatory but there is a full explanation of each in the manual.

Work On A Chart is the first and main option from the Main Menu. The documentation recommends that you work through this option in the documentation while you are at the keyboard. From this option the operator cannot not only create or modify a chart but also save charts, load charts and print charts. These additional capabilities eliminate constantly going back to the main menu to carry out these three options. Another nice touch by the folks at HavenTree.

This program provides so many options in some areas that it amazes me. The authors went to a lot of trouble to make it easy on the user. For instance, when you are asked for a filename from the chart editor you can enter a simple name like LON (the program adds the extension), or you can enter a full pathname (D:\FLOW\DATA\LON), or press ALT P to display a list of the charts in the current directory and point to one with the mouse to activate it or enter a path to a directory and use ALT P and carry on as in the previous selection.

Once you have entered the chart editor the screen appears as shown in Figure 1. The first box in the upper left of the screen contains the status bar that tells you where you are in the program. The next box down contains whatever text that is to go inside the current shape or a message concerning the current operation. The next box down is the current shape window that displays which shape you have requested (see Figure 2 page 282). Below this is a box that displays the Information Display window containing the filename of the working chart, the default directory, version number of EasyFlow, current printer configuration and the amount of available memory.

The largest window, on the right of the screen, is the Chart window. This displays the chart being worked at the time. If the chart is small enough the entire chart is displayed, if not only part of the chart will be displayed and you will have to scroll over or down to see the rest of the chart. Print inside the shapes will be too small to read in the chart window but each shape, as it is highlighted by the shape cursor, is displayed in the current shape window. This display is large and is legible without strain.

The charts are done on a 16 x 16 grid which is 16 shapes wide and 16 shapes high. The grid is assigned columns (letters) and rows (numbers). If you will look again at Figure 1 you will see "A1" after the text. This identifies the posi-

continued on page 282

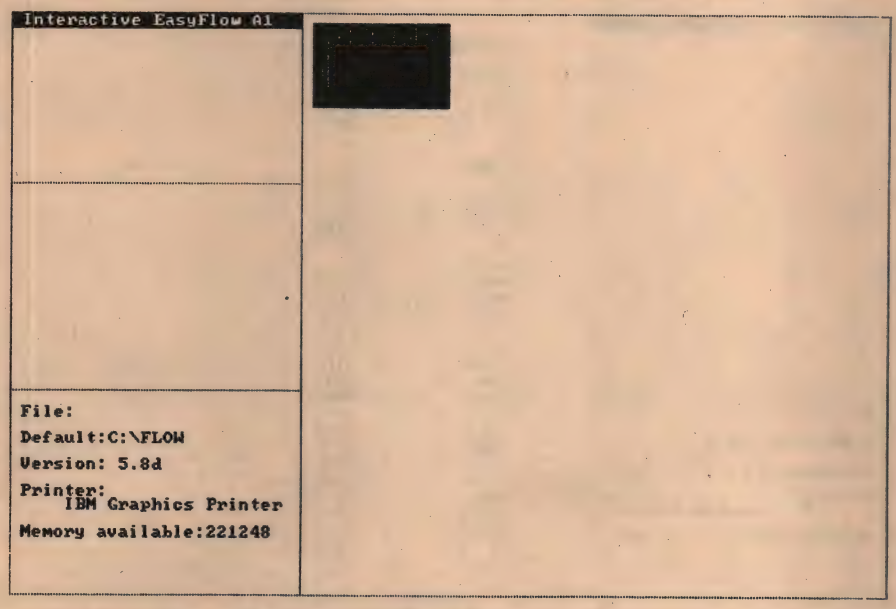

Figure 1

Programming Watson
continued from page 280

noon) since the previous midnight. If that condition is true, VIS will jump to the third following card (card #4). If neither condition is true, VIS simply moves to the next card in sequence (card #2). Note the "A" in the "Key Field." This identifies this card as the first in an "A"utoanswer sequence. All incoming calls are handled with the card sequence beginning here.

Card #2

Explanation: The voice message recorded here was "Good morning." The "C" in the "Key Field" will appear in all the following cards. It means that these cards are a continuation of the VIS card sequence started with the "A" card. The command "NEXT: JUMP 3" instructs VIS to jump to the 3rd card in the sequence after this voice message is delivered. That is, jump cards 3 and 4 to card #5.

Card #3

Explanation: The voice message here was "Good evening." We "JUMP" now to the 2nd following card—card #5.

Card #4

Explanation: The voice message here was "Good afternoon." "JUMP" to the very next card—#5.

Card #5

Explanation: The voice message with this card is "If you are calling from a touchtone phone, please press any button now." We NEXT execute the "TEST" command, one of the unique features of the VIS software. It waits 10 seconds for the caller to press a button on his touchtone phone. If a button is pressed (the condition is true), we will jump to the 3rd following card (card #8). If the condition is false (no button pressed), we assume the caller has a rotary dial phone and go to the very next card.

Card #6

Explanation: The message here is "We're sorry, but without a touchtone phone you are unable to control this information system. Please answer the following questions so that we may send more information about the Healthline to you in the mail." The "NEXT" command sends the caller to a subroutine beginning at card #11900. This is analogous to a "GOSUB" in BASIC.

Card #7

Explanation: We are returned from the routine at card #11900 and now deliver a voice message that states: "Thank you for calling. Remember: when you call again, use a touchtone telephone." The "NEXT" command is simply to hangup the phone.

Card #8

Explanation: This begins our user-directed session. VIS delivers the voice menu: "Press 1 to hear about heart disease, press 2 to learn about...etc." We have already determined our caller is using a touchtone phone. The first command—"NEXT: NUMBER 1" allows Watson to accept one digit pressed from the push button phone. If more than one number is pressed, only the first pressed is accepted. Watson then takes the number pressed, and adds 110 to it. The third command is a "JUMP" to the card number coinciding to the number pressed + 110.

continued on page 282

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EasyFlow
continued from page 281

tion of the Shape Cursor (the black rectangle in the figure) and changes as you move through the chart, the same as a spreadsheet.

HavenTree notes in the documentation that they really can't call the menus "Pull Down" menus because these are a tradename belonging to someone else (someone with bigger lawyers). For a while they considered putting them on the bottom of the screen and calling them "Throw Up" menus but for some reason that idea wasn't too popular either. Whatever they are called you are able to use them with a mouse or by the keyboard as you desire and they work very well.

If you should happen to make a mistake EasyFlow will Beep at you to get your attention. When it does Beep you can press F1 for Help and the first message displayed will deal with the current error. The help function is excellent and should get you through most of the operation of the program.

Flow charting makes use of various shapes to indicate different types of processes or operations. EasyFlow contains 65 of these shapes that you can call up from the menu (see Figure 3). As you highlight the shape name it is displayed in the current shape window to the left. If you select this shape it will be displayed in the chart window and you can add text as you see fit. The text inside a shape is automatically center justified by the program. There is a lot more to flow charting than I thought if you are going to do it right. Haven-

continued on page 283

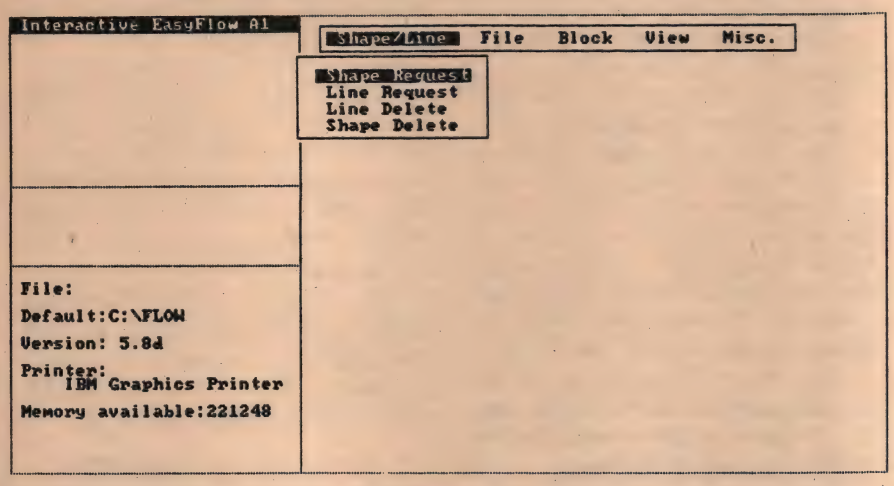


Figure 2

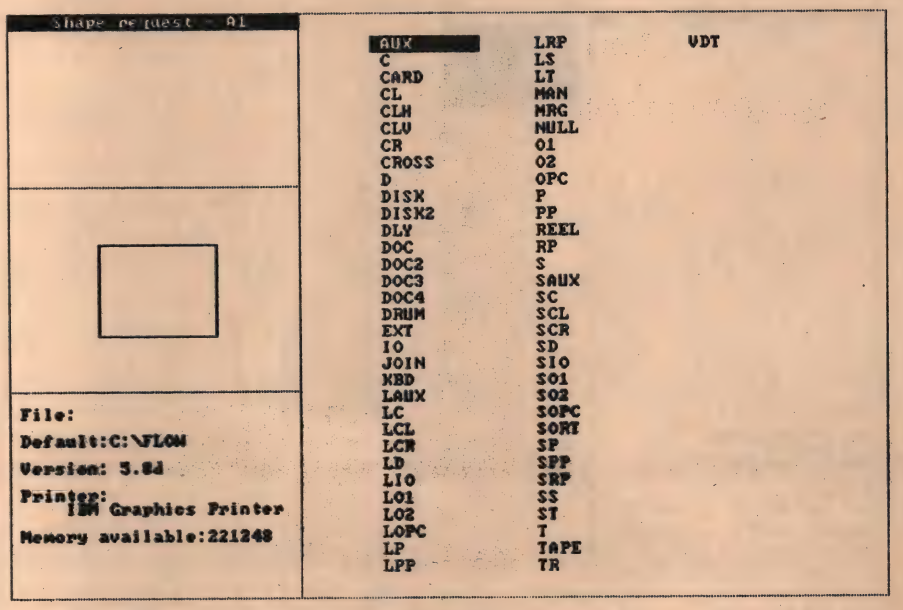
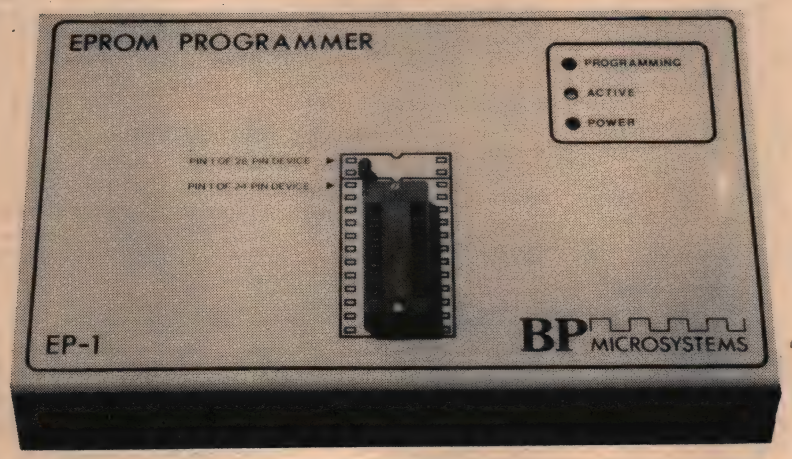


Figure 3

EPROM PROGRAMMER



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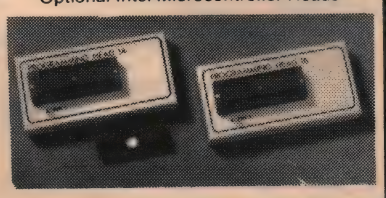

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Programming Watson
continued from page 281

If a choice is made that does not have a corresponding card number, we move to the next card (card #9).

Card #9

Explanation: The voice message here is "Sorry. That is an incorrect choice. Please try again." And the command that is issued, will "JUMP" back to the preceeding card (card #8) and redeliver the voice menu.

Card #10

Explanation: The user has pressed menu item 1 and we now give the message on heart disease. Once the message is delivered, we "JUMP" to the sixth following card (card #16).

Card #11

Explanation: Item 2 was selected from the menu and health message #2 is delivered. When completed, we jump 5 cards—again, to card #16.

Card #12

Explanation: Message 3 is delivered, jump to card #16.

Card #13

Explanation: Voice message 4; jump to card #16.

Card #14

Explanation: Voice message 5; jump to card #16.

Card #15

Explanation: Guess what happened?

Card #16

Explanation: We have delivered our chosen message and now deliver a "Thank you for calling..." final message. The NEXT command is hang-up.

Card #17

Explanation: This is our "GOSUB" called from card #6. We deliver a "After the tone, please say your name." VIS delivers a tone and then records to disk whatever the caller says for 15 seconds and goes to the next card.

Card #18

Explanation: The voice message now asks the caller to say his/her address. It records for 30 seconds to disk. Next card.

Card #19

Explanation: We ask for the caller's phone number and record it for 20 seconds. Next card.

Card #21

Explanation: This is the final card in the "GOSUB." We say "Thank you for your cooperation" and do a "RETURN" to card #7.

Final Thoughts

Voice mail is a remarkable thing to work with. The Watson VIS option makes it flexible, programmable, and lends its immense potential. I have only touched on the possible capabilities in this limited example. A similar caller-directed sequence can be delivered as a "dial-up" program as well as for telemarketing. The manual for the VIS option explains the commands available adequately. Unfortunately, there are not enough example sequences for my taste. The discounted price for Watson is now about $400. For the marketing professional—in all walks of life—it can be a superb tool. For a demonstration, you can call the Watson demonstration system at 1-800-6-WATSON. ●

EasyFlow continued from page 282

Tree provides some excellent instruction in the documentation to help you out.

Four of the most commonly used shapes denote Terminal (Start or stop), Process (General processing), Decision (Making two or three way decisions) and Input-Output (Information to-from the user). There are more than 40 general types of shapes supplied with many having several variations (Figure 3).

Once the shapes are in place you request lines by using the Line function. Placing the cursor on a shape and requesting a line produces several immediate changes. The Status Bar shows "Line Request" and the cursor becomes a small blinking block. Moving the cursor to the destination block leaves a heavy dark line on the screen that becomes a neat, thin line when you hit the next shape. You don't need to worry about the route except that it must not touch any other than the destination shape. You can run it all over the screen if you want because EasyFlow will end up using the most direct correct route. If you come back later and add a new shape that interfere with a line the program will automatically re-route the line so it is in the clear. This has got to be one of the best points of this program. It will certainly save you a lot of time and frustration.

Lines may be assigned one conditional text word when the line is created. Figures 4 & 5 on page 300 shows three of these around the shape with the text "How is the temperature?" Default lines are solid but you can opt for dashed lines by using ALT L. Mixed lines can be created by using the TEXT/DRAW option. Lines can be edited, moved or deleted as needed. EasyFlow will even merge lines if possible when it routes them as part of the normal process.

EasyFlow has a cut and paste function that lets you piece charts together, move blocks of the chart to another location, save blocks of the chart to disk and call up blocks and place them in the current chart. HavenTree calls the markings that cover shapes marked for block operations "Measles." These measles let you see what you have marked for block operations without confusion.

Loading and Saving charts are as you would expect. The program takes whatever name you supply and adds the appropriate extension when it is written to disk. When you call for a directory only the charts in the current directory are displayed.

Printing is a matter of making sure you have the right printer configuration and selecting PRINT from the menu. If you are using a IBM Graphics type printer and your charts have broken lines go back and re-configure. You have selected the wrong configuration and probably need to use "IBM Graphics Work a Like." I mention this because it happened to me and darn near drove me nuts until I found the information in the documentation. My Fujitsu DL2400 emulates the IBM Graphics but it needed the work a like option.

Charts too large to be printed on a single page will be broken up into several pages that you can play jig-saw puzzle with later on. If you want you can opt for compression both vertically and horizontally to squeeze a large chart down in size. Charts for reproduction might need to be darker than one pass of the printer will produce. If this is the case there is a "Hammer" option that will call for up to 9 passes on each line.

An interesting option deals with the arrows serving as line terminators. They can be set to be completely off as with an organizational chart or several variations of on and off depending on the need of the chart.

The TEXT/DRAW editor allows you to make changes in the chart that the program might not allow automatically. Blocks of texts and arbitrary lines are two of the items handled in this option. These do not follow the conventions set up within the program and can go anywhere you want to put them. These arbitrary lines answered the one problem I had with EasyFlow, lines with arrows on both ends <---> instead on just one end.

EasyFlow's documentation leaves nothing to be desired. It is a good introduction to flow charting as well as an excellent operations manual for the program. If you use the first part of the manual to get started and then use the help function you will not have any

continued on page 284

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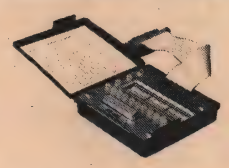

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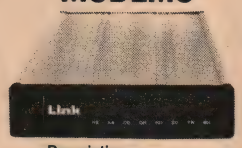

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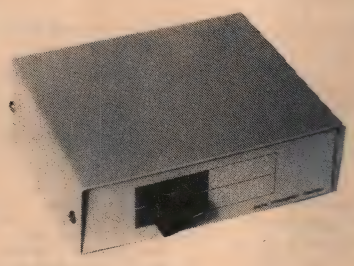

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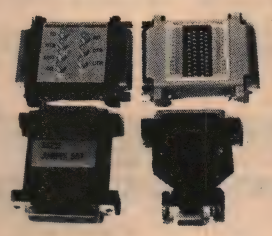

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Intel Inboard
continued from page 182

have an 8080 and you don't have an 80387 you can forget about the switch. For some other combination of events read the manual and follow the instructions.

Here comes the tricky part and the reason you pulled those boards to get some working space. There is a flat ribbon cable with connectors at both ends in the installation kit. One end plugs into the 8088 socket and the other attaches to the Inboard 386/PC. It's impossible to get mixed up as to which end is which. The cable isn't too long but it is long enough if you use the Inboard 386/PC in one of the slots over by the power supply. The manual tells you to use slot two or three for a PC and a slot five or six in an XT. But first, get the cable attached. A drawing shows a mark on one end of the plug, a round black dot. What you will actually find is a square white sticker. The marked end of the plug is to be down at the end of the 8088 socket which is notched. That is shown in a very clear drawing in the manual.

Plugging the 40 pin male plug into the 8088 socket is not too hard if you have lots of light, a steady hand and take your time. You are partly working in the blind as the plug hides the socket while you are doing the work. Try and see one end of the socket, towards the front of the computer, and work with the two plug pins that are visible. A strong flashlight helps. I hold the little light in my mouth for this kind of job.

Replace the boards that were taken out of the computer and put the Inboard 386/PC in the proper slot, as per the manual. The cable plugs into the board and you are finished except for buttoning up the case.

Up And Running

Intel did us all a great favor by not putting switches or jumpers on the Inboard 386/PC, just plug it in and forget it. Assuming that all has been done according to the instructions you are now ready to run the setup software. Intel packs a disk with 11 programs in the Inboard 386/PC box. You won't need all of them. Actually, the computer will run without any of them.

The most important program on the disk is INBRDPC.SYS and it goes into your CONFIG.SYS file. This program enhances the boards hardware capabilities. Another file, the disk cache software, will probably go in your AUTOEXEC.BAT file. For those people who like things done for them a program called SETUP will setup and install everything for you. Just run it and answer the questions as they come up on the screen. The program creates CONFIG.SYS and AUTOEXEC.BAT files if none exist.

Another program supplied is one from Qualitas, Inc., which (among other things) turns extended memory into expanded memory. There is a little expanded memory left over from the 1 megabyte of memory on the Inboard 386/PC and this program might be of some use to you.

A better deal is the EMM.SYS (expanded memory manager) program on the disk. For this to work for you an expanded memory board is a must. I had an old Apparat LIMBO board with 1280K on it and I couldn't find anyone who could tell me if it would work with the Inboard 386/PC. I was concerned because the LIMBO boards chips were old and slow, a mixture of 64K and 265K chips rated at 150 ns. To my surprise the board (via Soft Logic's Carousel program) did work. There

continued on page 287

EasyFlow
continued from page 283

problems with EasyFlow. The documentation is paperback, half/sheet sized and interesting enough to sit down and read from cover to cover. The Index is superbly written and will take you wherever you need to go with little fuss.

The program runs without any noticeable problems. I was unable to lock it up using the normal dumb stunts. It is remarkably fast especially in updating the screen during the charting operations. I would like to see color printer support even though there is support for the plotters with pen selection. I suspect that HavenTree will include some of the more popular color printers in a future update. It would be nice to use the color capabilities of my printer to make transparencies of the charts.

If you use flow charts I don't believe that you could go wrong in any way with this program from HavenTree!

EasyFlow, $149.95, HavenTree Software Limited, P.O.Box 1093, Thousand Island Park, NY 13693. ●

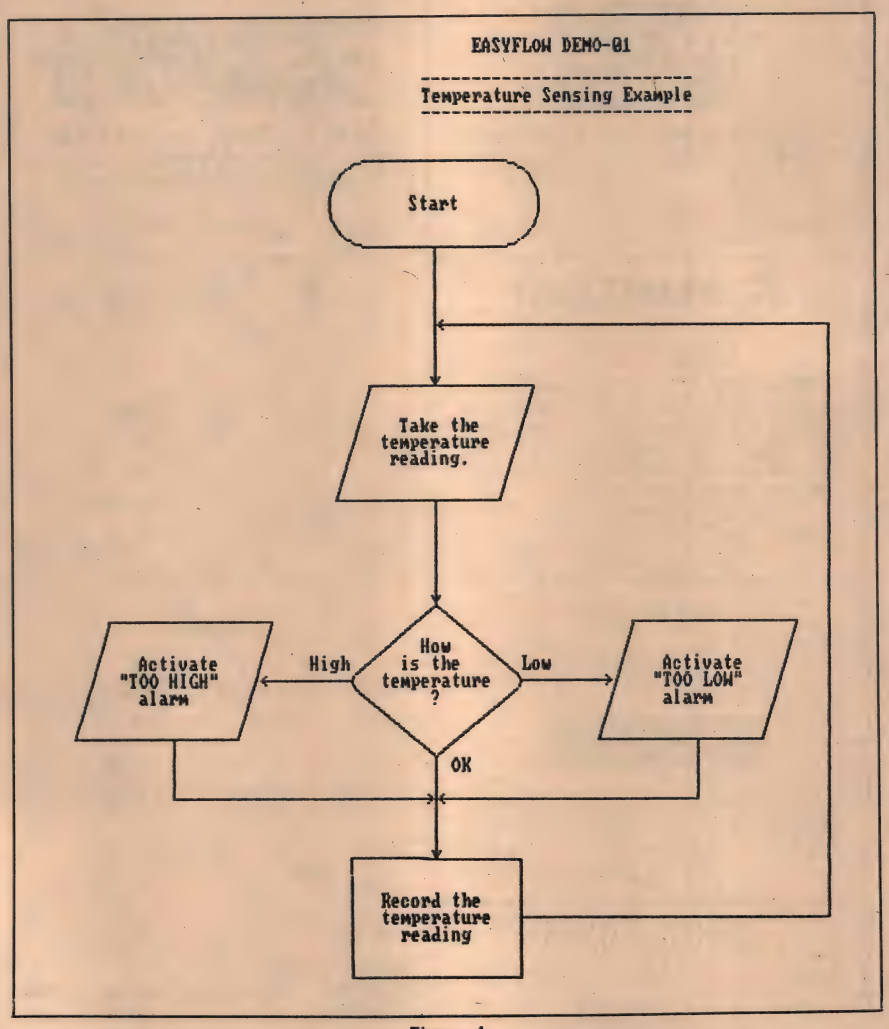

Figure 4

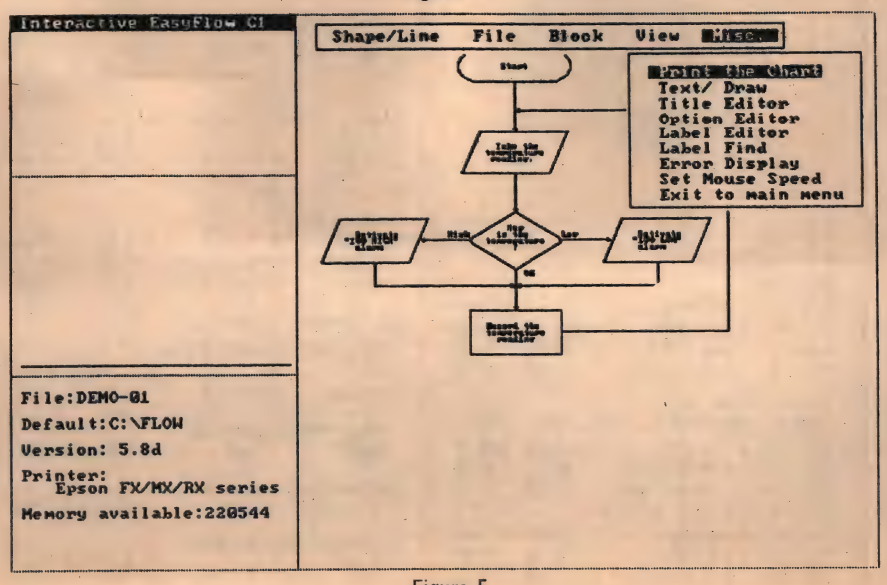

Figure 5

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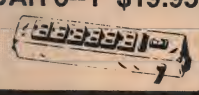

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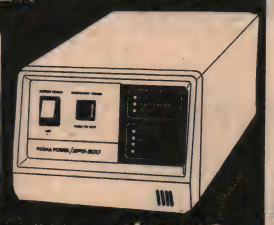

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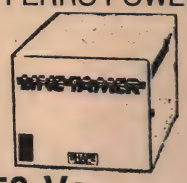

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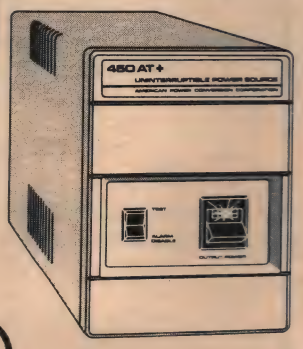

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Inside Concurrent DOS continued from page 182

allow similar independent processing and I/O control, which means that multiple co-processing operations will seriously degrade system performance.

What makes DRI's Concurrent DOS 386 such an important contribution to the 32-bit technology of 80386 systems, is that it has the resources within the kernel of the operating system to allow OEMs to adapt it to co-processing operations such as multi-user graphics. How it will grow into the next hardware generation will be an interesting evolutionary process to watch.

Unlike DOS which controls most external hardware operations at the device driver level, CDOS 386 does so through the kernel of the operating system. This is the only way to maintain system integrity and a high level of performance in a multi-user set-up. Thus, when you begin collecting hardware for a multi-user system, you will find that the documentation specifies certain types of Multiport I/O cards and serial terminals which are supported by the kernel. This functionality in the kernel is provided by hooks and system calls. These are the meat and potatoes an OEM can access to change the character of the operating system to almost any kind of hardware.

As it is delivered at the retail level, Concurrent DOS 386 is considered a general purpose operating system. But through the Programmer and System guides available to OEMs, CDOS 386 can take on chameleon-like qualities for vertical market applications such as clustered networks, desktop publishing, computer aided design, and even process control, with the addition of appropriate hardware. DRI supports the VAR and OEM markets because the Concurrent operating systems were originally designed to be implemented within many different types of multi-user hardware environments by these systems integrators. By encouraging OEMs to customize the operating system, they can offer their customers uniquely different value-added products that don't compete directly with other DRI OEMs. All do, however, share the DOS application compatibility. In the DOS market it is difficult to distinguish one system from another, except on price and physical appearance.

An OEM who has produced a large assortment of customized CDOS 386 and CDOS-XM operating systems is Concurrent Controls, Inc. The company is staffed with former DRI programmers and engineers who had originally helped to design Concurrent DOS. In addition to distributing their CDOS implementations through dealers and VARs, they do contract programming for many leading DRI OEMs. Their latest offering has moved CDOS 386 into the graphics market.

Smartscreen from Concurrent Controls is an enhanced and modified version of CDOS 386 release 2.0 that supports full graphics capabilities for multiple users, with direct screen access and bit-mapped screen redrawing at incredible speeds. The hardware engine used by Smartscreen is Arnet's Multiple Video Adapter (MVA). It supports the connection of 1 to 4 monochrome, Hercules-compatible monitors and AT-style keyboards to the main 386 system instead of terminals.

The Concurrent interface to the monitor workstations is transparent to the application software. Software developers and graphics write directly to the video RAM of each display. This is in contrast to standard Concurrent DOS 386, which remaps all of the screen codes from the main system to the dumb terminals by emulating screen writes. Because there is no emulation occuring on Smartscreen, each user is afforded the maximum possible performance. The more screen-intensive the program, the faster it will run on Smartscreen. In addition, Smartscreen provides the maximum in DOS compatibility because it doesn't have to detour with screen emulations. Those video RAM addresses that ill-behaved PCDOS software writes to have a direct pipeline in every workstation.

Like Concurrent DOS 386 2.0, each workstation supports two virtual screens, allowing users to swap screens and tasks at any time. Printers, both serial and parallel, can be shared and accessed by all users. They can also be assigned as local resources for individual workstations, i.e. COM1 and COM2, for PC programs that require or are looking for those ports.

In gaining this increased graphic compatibility, Smartscreen has not lost any of the standard Concurrent DOS 386 PCDOS compatibility but has improved upon it. Concurrent's INT handling has been expanded and, in addition, Smartscreen boasts a TPA approximately 128K larger than standard Concurrent DOS, in support of the more RAM-intensive graphics and design programs.

A typical demonstration of Smartscreen would include simultaneous display and use of DRI's GEM-based Desktop Publisher, GEM Draw Plus, Lotus with full graphics, Autocad, and Supercalc4. For a little more flash, you would also see multiple copies of Flight Simulator running in addition to the foregoing applications.

Arnet's MVA is a 16-bit plug-in board. It is connected by ribbon cable to an oblong box with four RS422 connectors. A shielded RS422 cable can be strung from each port to a Transporter and Video Monitor Control box up to 500 feet away. A Hercules-compatible monitor and AT-style keyboard are plugged into each control box which now becomes a multi-tasking virtual console.

Two MVA cards can be plugged into a 386 host machine, providing up to 8 graphics workstations. In addition, a variety of standard Multi-port I/O cards can be used to provide local and remote access to many different printer/plotter and communications devices. The user sets up this hardware through the CONFIG utility that Concurrent Controls has built into Smartscreen. This is a spreadsheet type of utility with interactive help screens. When making or changing parameters, you are shown all possible choices and the implication of these choices. Before CONFIG writes these changes directly into the kernel of the operating system, it checks for the accuracy of these changes and any possible conflicts between the parameters chosen.

CCI expects to introduce an EGA/VGA version of Smartscreen with parallel and serial ports at each color graphics station at the Atlanta COMDEX. I should have this new software and hardware combination set up in my office for a future article. Smartscreen's documentation includes all the original Digital Research Concurrent DOS 386 manuals, plus an additional loose-leaf manual prepared by CCI. This covers an overview of the operating system as it was implemented to conform to the Arnet hardware environment, and a great deal of configuration data to allow end-users maximum flexibility. Smartscreen is an imaginative and impressive product.

CDOS Utilities From Logan Industries

Utility programs enhance the functionality of an operating system. Although Concurrent DOS 386 (and CDOS-XM) includes a number of useful built-in utilities such as the cardfile, printmanager, and text editor, most multi-user systems can be enhanced with some interesting software I recently received from Logan Industries.

These are a full-featured communications program, a terminal emulator, a memory resident printer buffer, and a multi-user conferencing program. The author is Alex A. K. Soya, who is widely regarded as one of the leading Concurrent DOS programmers in the country, and whose company does consulting work for DRI OEMs on a worldwide basis. He also operates the Eastcoast BBS for CONUG (the Concurrent User's Group); he can be found lurking on Compuserve's DRFORUM; and he is a frequent contributor to Micro/Systems Journal and other publications with articles on the technical side of Concurrent DOS.

PTERM—is just the terminal emulation program I've been looking for. One of the projects on my Concurrent DOS 386 agenda has been to set up a multi-user system using PC's instead of terminals. I felt it would typify the kind of business environment that Concurrent DOS 386 is likely to be used for, because not all multi-user systems are built from scratch with a 386 host and the PC terminals. I tried several terminal emulators but the results weren't totally satisfying. PTERM's documentation is a bit slender, so you have to do some experimenting to discover the neat tricks you can do with it.

PTERM isn't copy protected, but it has to be unlocked before you can use it. This prevents a company from taking a product with a single-user license and installing it on every machine in the house. When you first start PTERM it generates an ID code that includes the serial number of your disk. Write down this number and then call Logan Industries (or their BBS), for an Unlock Code. When you have the unlock code, you access PTERM again, and enter this number. There will be some disk activity while the program unlocks itself,

continued on page 288

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Intel Inboard
continued from page 284

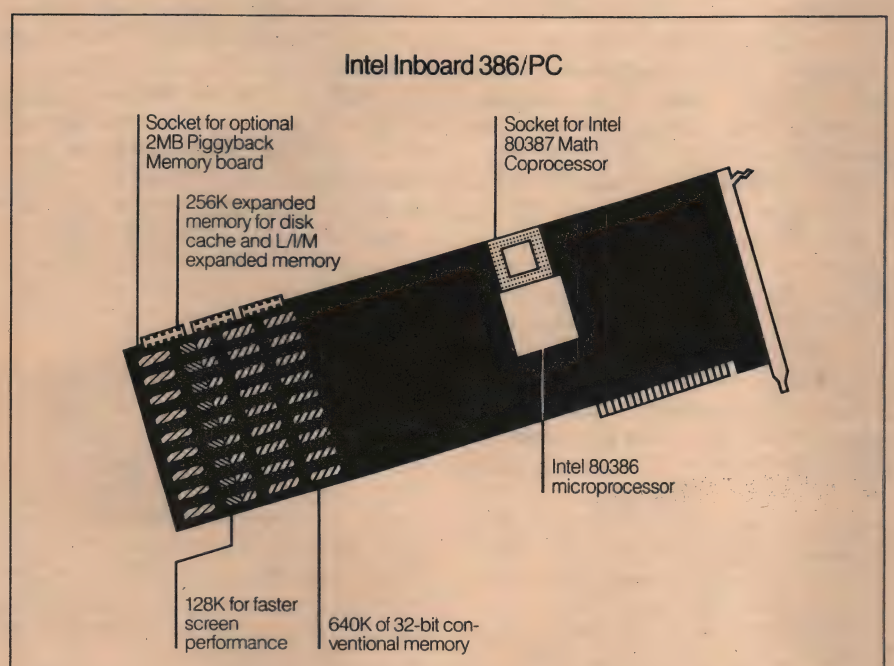
were occasional parity errors with the new setup but I have always had them. A public domain parity error interceptor had been installed several years ago to solve that problem.

Just to see what would happen I installed the EMM 4.0 driver from Intel, not really expecting it to work with my non-Intel expanded memory board. It worked like a charm and the parity errors were gone too! Everything is now flying along at high speed and I don't understand just how it is doing it, but I'll not look a gift horse in the mouth. If you don't already have an EMM board you can easily find a number of them advertised in the pages of *Computer Shopper*. Prices start at about $100 with 0K memory. 0K by the way, doesn't mean "okay" or tested memory. It means zero kilobytes; no memory in the memory sockets. Add it yourself. If you want to go first class buy an Intel Above Board unit, or their special Inboard 386/PC Piggyback Memory Board.

Here is something that the manual doesn't tell you: If you are using the SETUP program and for some reason already have disk caching software (from any source, Intel or third party) up and running you risk crashing your hard disk File Allocation Tables. Remove disk caching before running SETUP. I learned this from the Intel electronic bulletin board. I also downloaded a later version of one item of software from that BBS. The telephone number is in the manual on page B-3.

For the technically minded a section of the manual is devoted to explaining software optional parameters. Intel apparently hired competent writers to do the work on this chapter as it is actually 100% understandable the first time through.

Last year my best hardware buy was an add-on 3.5 disk drive. For 1988 I don't see how anything can top the Inboard 386/PC. Now my old XT should be good for another five years or so. With the 80386 I can look forward to Windows/386, OS/2, and all those other exciting things just over the horizon. ●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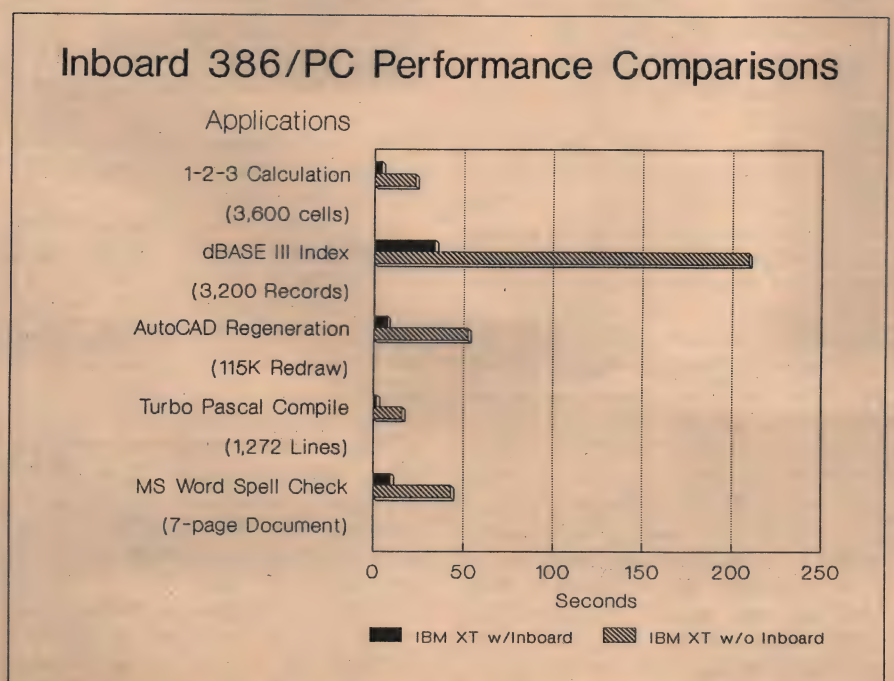

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InterPath Introduces Shield Against Computer Viruses

InterPath Corporation has developed an anti-viral shield for computer systems which will protect against the infection and spread of software viruses in IBM personal computers and compatibles.

The shield, called Cylene-4, is 100% effective against all known viruses. It has been field tested using over 1000 infected public domain and commercial software packages, and has been found to consistently detect viruses and prevent their spread.

The Cylene-4 shield is being marketed under the product name C-4, an InterPath anti-viral software package which was released in April of this year. C-4 resides permanently in the host system and monitors all host activity. It uses the Cylene-4 matching technique to identify characteristic viral signatures, and on detection it freezes the viral activity and notifies the system user. The virus does not have a chance to multiply or infect other software in the system. After removal of the infected software, the system is returned to normal.

"It is unfortunate that such a product is mandated by these times," said InterPath President John McAfee. "But the thoughtless actions of a few malicious hackers have endangered the entire field of personal computing. It is clear that C-4 and subsequent similar products will become an integral and ubiquitous part of our future."

C-4 is available for IBM PCs, ATs and compatibles and uses 10K of system memory. It may be ordered direct from InterPath and sells for $29.95.

InterPath Corporation, founded in 1983, supplies software, interface hardware and access tools for personal computer users. It is a leader in voice recognition technology and algorithm development for pattern recognition.

For further product information contact InterPath Corporation, 4423 Cheeney St., Santa Clara, CA 95054; (408) 988-3832. ●

Inside Concurrent DOS continued from page 286

after which you can then make back-up copies.

Connecting a PC/XT or even AT computer to a 386 host under CDOS 386, is done in the same manner as a terminal. You configure your parameters (baud rate, data bits, etc.) and match them at the host through the SETUP utility within Concurrent DOS 386. If you plan to connect more PCs than you have serial ports, a multi-port I/O card as mentioned in previous articles will have to be installed.

My favorite way of using PTERM is to run it under a multi-tasking window with DESQview on the PC. First load DOS and DESQview on the PC, then switch to a window and load PTERM. Now you have access to your PC's native functions in one window, and access to the 386 host computer running CDOS 386. If you wish to mate a 286 AT computer to a 386 host, you can install Concurrent DOS-XM and use one of the virtual windows to run PTERM to access the 386. These methods allow you to use two operating systems at the same time. You can transfer programs and files back and forth between the two systems, and perform cut-and-paste operations on the PC with extreme ease. This method offers some neat applications with background processing and communications.

CO—provides facilities for message conferencing on a multi-user system. It isn't limited to CDOS 386. It will also work with any version of CDOS-XM 4.1 through 6.0.

Multiple users may participate in the conferencing from their terminals. A message typed by a user is transmitted to all others who are using the CO utility on the system. Messages are transmitted on a line by line basis to allow editing of the currently typed line and to make use of system resources in an efficient manner.

On systems using DR NET (Digitial Research's networking software) to link multiple system clusters, CO can be used to allow conferencing across the network. CO provides for separate conference rooms. This means that networked clusters can do their own conferencing without interferring with other clusters. Clusters in other departments can also communicate with one another.

The exact number of users who can participate in a conference on a given system depends heavily on the system resources. Items such as the Number of available Process Descriptors, Queue Descriptions, and Memory play a role. However, as a general sort of guideline, CO will support up to 10 or 12 users on a multi-user cluster. On extended systems a larger number is possible. On networked cluster, CO will support up to 200 users. CO may be used in conjunction with the CALLME and CALLUS remote console supervisors, clusters can conference by modem through telephone lines.

PUFF—the Magic Buffer. It's a silly name, I suppose, but it does the job, and it's more to my liking than the CDOS 386 Printer Manager utility. PUFF works in the same fashion as Printer Manager. Both are memory resident buffers that can be used to manage the printing pipeline within a multi-user system.

Concurrent's Printer Manager is strictly ASCII based and will not accept formatted documents. My favorite word processors, including my library of GEM applications, produce formatted output, which means a general purpose buffer must be used to perform background printing. PUFF generates a 100K buffer area, but has provisions to allow users to set specific values. PUFF will support only one printer at a time. It doesn't have Printer Manager's flexibility to support multiple printing devices at the same time, but its support of formatted documents is what I needed for my system.

VOYAGER—is an excellent full-featured communications and terminal emulation package. It provides the usual resources for communicating with on-line databases, but its strength lies with its ability to access mainframes.

VOYAGER is available in versions that support the PC/MSDOS or the Concurrent DOS operating systems. It isn't a program that was ported from one version to another, but written from the ground up to take advantage of the system resources of each operating system.

It supports a wide variety of protocols, including XMODEM, XMODEM/CRC, YMODEM, YMODEM-BATCH, KERMIT, and the Compuserve-B file transfer protocol. It has a sophisticated compiled script language that allows you to program VOYAGER to call a host-system, perform a set of transactions with the host, and disconnect from the line. It is possible to write scripts which will call a system without any operator interaction. You can, for instance, use it to have VOYAGER call a system at a particular time of the day to capture all new mail messages addressed to you, upload a file from you to the host, or download daily reports from a host.

VOYAGER is a very complex program which has a lot of commands to learn. The documentation consists of a 132-page manual that describes all program commands and provides examples for their use. Although I did not have the facilities to check out mainframe communications, I tested it on a 3-user system set up on my Kaypro 386 and did simulated communications to an Acer 1100/386.

VOYAGER is not for the beginner. It requires an advanced level of expertise to understand the manual and to use its features. Although a number of Digital Research OEMs and ISVs have adapted terminal emulation packages to systems of networked clusters, the general consensus among VARs is that VOYAGER is the software package of choice.

Prices are as follows: PTERM ($129), CO ($135), PUFF ($100), and VOYAGER ($199). For additional information, please contact Logan Industries, Inc., 604 Mango Drive, Melbourne Beach, FL 32951; (407) 984-1627.

For information on the SMART-SCREEN/386 multi-user graphics operating system and the Arnet MVA controller, please contact Concurrent Controls, Inc., 3770 24th Street, Suite 206, San Francisco, CA 94114; (415) 648-2174.

I should also like to mention that Concurrent Controls has taken over CONUG, the Concurrent Users' Group,

continued on page 289

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Document Indexing Programs—Part II

Reviewed by Ronny Richardson

Introduction

Last month in Part I of this review, we looked at ZyIndex and Office Correspondence Retrieval System. This month, we will look at several newer packages trying to gain a share of this growing market.

WordCruncher

Summary

WordCruncher is not intended as a generic document index program. It is designed to handle large ASCII documents that never/rarely change. Learning to use WordCruncher was more difficult than the other programs. In addition, document preparation time is non-trivial. Businesses or individuals looking for a program to manage the paperwork they produce should look elsewhere. Scholars or universities looking for a tool to aid them in literary research will find WordCruncher to be an excellent tool.

Installation

WordCruncher comes with an automatic installation program. The program will create the sub-directories you specify to be used for storing the program and tutorial files. The program will verify that your CONFIG.SYS file has a FILES = 20 or greater statement. If not, it will modify your CONFIG.SYS file and reboot the computer.

Indexing

WordCruncher is really two separate programs, IndexETC and ViewETC. Electronic Text Corporation (a company formed by Brigham Young University, the authors of the software) has separated these two programs to a larger extent than any other vendor, you can purchase them separately for $170-each. This keeps with the general philosophy of WordCruncher. Indexing is a mundane chore best assigned to a central staff or assistant. Searching and studying the document is the sexy part, best left to the researcher. The two programs even reflect this philosophy. The indexing program has a boring monochrome screen while the search program has a sexy color screen with windows.

The first step toward indexing a document does not involve WordCruncher at all. You must first convert the document to ASCII. Then you edit the document to place markers in the text to be used by WordCruncher. These markers are used to subdivide the text into meaningful sections, like chapters and paragraphs. WordCruncher will work without this set, but its usefulness is reduced.

You are not allowed to use your own extensions with WordCruncher. You must use .BYB to indicate a book file, .BYC to indicate a character file, .BYD to indicate a dictionary file, and so on. Each type of file has specific types of marker codes it expects.

One problem not well addressed by the program is the (quite likely) problem of mis-marked files. The program has no functions designed to verify the logic of the markings and no shortcuts to aid the user in verifying the markings himself.

Once you have a properly marked ASCII file, the next step is to run IndexETC. The program has blanks for you to queue up to twenty files for processing. No wildcards are allowed and you must enter the full path for each file. If you have more than twenty files, you must wait till it processes the first twenty before entering additional files. Batch file processing, wildcards, or any other short-cut are not supported.

Once you have entered the filenames, the indexing program goes to work. As it processes each file, it produces as estimate of the processing time for that document. It will not estimate the time required for all queued documents. As an indication of the type of documents it expects, the blank for estimated time has room for a time just short of ten hours!

The bottom line is that the indexing program is difficult and time consuming to use. Electronic Text Corporation has recognized that fact and will index files for you for $35 per hour. Since this saves you from purchasing the indexing half of the program, it could be a wise investment if you plan on using WordCruncher to research only a few documents.

Search

The search program only allows you to search one document file at a time. Instead of simply entering a word to search for, the program presents you

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Inside Concurrent DOS
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and the publication of its bi-monthly magazine. Write to them for membership information. Any serious user of the Concurrent DOS operating systems will enjoy the technical articles, product reviews, and up-to-date news on DRI's activities. The $25 annual membership in CONUG includes a subscription to RESOURCE, and access to its BBS systems. These contain a sizable library of public domain programs and utilities specifically written for the Concurrent DOS operating systems, as well as a technical assistance forum and message section.

For information on the Concurrent DOS multi-user, multi-tasking operating systems, please contact Digital Research, Box DRI, 60 Garden Court, Monterey, CA 93942; 1-800-443-4200. ●

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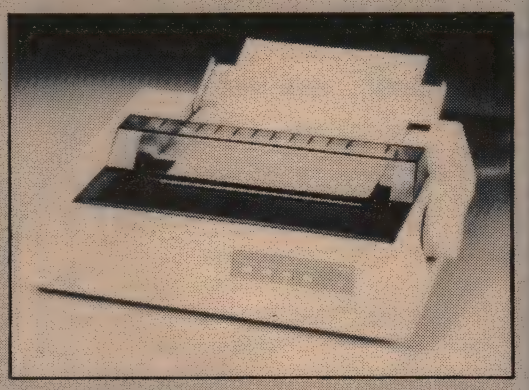

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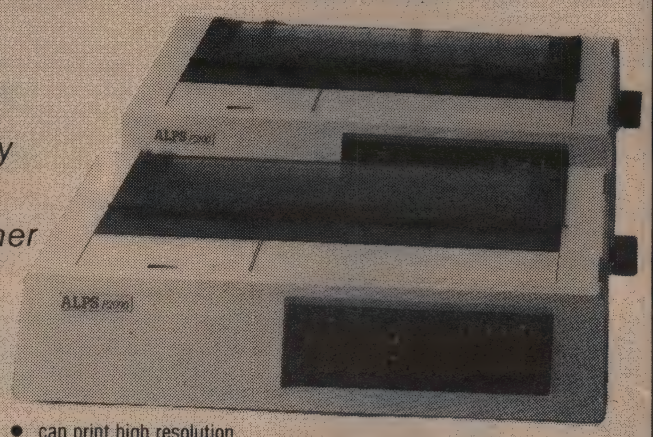

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Document Indexing continued from page 289

with an alphabetical list of every word in the document (less a few noise words) and you select the word(s) you want from the menu. You can speed-find a word in the menu by typing the first few letters of the word. The program will show each word in context, showing several lines with each word.

The search program does have an option to link several documents so you can search more than one document at a time. The manual states that this is limited to works by the same author. The program does nothing to enforce this requirement. When several documents are linked, they are treated as one large document by the search program.

Other

Once you have found the word(s) you are looking for, they can be extracted to a separate file, printed, or indexed separately.

WordCruncher is designed to be used by blind and limited-site individuals. It can be customized to play a separate tune for each section of the program and it was designed from the beginning to work with different speech synthesizers. (These "read" the contents of the screen any "say" them in English.)

The help screens are very poor. It is impossible to use WordCruncher without the manual, period. The help screens give only limited information and often you cannot even understand the help screens without the aid of the manual. With the other programs in this review, I was able to scan the manual once and productively use the software. Not so with WordCruncher. It took me carefully reading the manual several times to become productive. If you select WordCruncher, plan on spending a good deal of time getting up to speed.

This would be bad enough, but it gets worse. The manual is extremely poor. It is difficult to read, confusing, and has numerous screen illustrations no larger than a penny. In addition, a large number of different typefaces are used in the manual. The user is supposed to remember which typeface stands for a shifted or alternated key and respond accordingly.

The search program allows you to reassign keys. The manual takes this into account and rarely refers to the default keystrokes to perform an operation. Instead, keystroke functions are refereed to by name, like Print.

In addition to English, WordCruncher will work with French, German, and Spanish. It will work with the Duke University Language Toolkit to display the special characters these languages require, provide you have an EGA display.

Benchmarks

I used WordCruncher to index the ASCII versions of the 925K, 68-test files. It took WordCruncher almost 33-minutes to index the files. That time does not include the time it took me to mark the files for processing or the time required because not all the files would fit on one screen and wildcards are not supported. This is just the raw processing time. The true total time was almost an entire eight-hour day. The resulting index files were the largest in this review, 1,747K. Each 10K file resulted in almost 19K of indexes, not including the original file.

Limitations

WordCruncher has several major limitations. While they have all been discussed elsewhere, they are collected here:

1. An extremely poor manual.
2. Poor help screens.
3. Cumbersome user interface.
4. Requirement that files be in ASCII format with special internal markings.

Conclusion

WordCruncher is a very powerful and useful tool for literary research. It is a very poor tool for managing the flow of documents for an individual or business.

WordCruncher costs $299 ($199 for colleges or universities) for both packages or $170 each for the indexing and searching packages. Neither package is copy protected and both come with a 30-day money-back guarantee. An additional package, called the Constitution Papers is available. It consists of preindexed copies of the US Constitution, the constitutions of all the states, and some of the works of Shakespeare and Mark Twain. Technical support costs $1.00 per minute and the call is not toll-free. One hour of technical support is included with the package and the company does not charge for calls regarding the search program or bugs in the program.

WordCruncher is available from Electronic Text Corporation. The address is 5600 North University Avenue, Provo, Utah 84604. The phone number is (801)226-0616.

Memory Lane

Summary

Memory Lane is a memory resident document indexing program that monitors your work to decide what to index. In this case, being memory resident has no advantages over the non-memory resident programs.

The first version of Memory Lane (1.1) was very buggy. Group L sent out a correct version free-of-charge to every registered user. I like that type of commitment to customer support.

Installation

Memory Lane comes with an automatic installation program. This program creates a sub-directory called ML, copies the files to the hard disk, and modifies your AUTOEXEC.BAT file. If you have more than one hard disk, you can select the hard disk to install the program to. You have no control over the name of the subdirectory. The changes made to your AUTOEXEC.BAT file include modifying your path and, optionally, adding the commands to start Memory Lane.

The installation program runs in such a way that it is easy to improperly install Memory Lane. Group L is aware of the problem and will correct it in the next release. If you own Memory Lane and have had difficulty installing it, call Group L and they will "walk" you through the installation.

Indexing

The other programs in this review are able to determine which files have changed without being memory resident. Memory Lane cannot. In order to determine the files needing to be reindexed, Memory Lane must be memory resident when those files are modified. When Memory Lane is resident and a file is modified, Memory Lane adds that file to a lists of files requiring reindexing.

Memory Lane uses a files list, called ML.PRV, to list those files that are not to be indexed. This file can be modified using any ASCII word processor. There are a few problems with this method:

Memory Lane only reads this file when first loaded into memory. If you have problems with the file, you must make a change, reboot, load Memory Lane, see if the problem was corrected, and if not then start over.

The ML.PRV file exclusion file uses non-standard syntax. You would expect to enter -d:*.* to exclude all the files on the D drive. Memory Lane uses -d:* instead.

According to Group L, a future program will present you with a map of your hard disk from which you pick out the files to index.

Memory Lane is memory resident, requiring almost 75K. (Its exact size will depend on your DOS environment. Every program, including memory resident programs, get a full copy of the environment. If you expand your environment, each memory resident program will require more RAM.) In spite of memory resident, Memory Lane has no additional functional features not available on non-memory resident document indexing packages except the ability to search for a document while in the middle of doing something else.

With almost everyone straining to fit all there existing applications into 640K, I cannot understand why this

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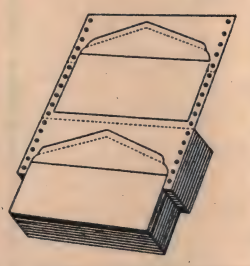

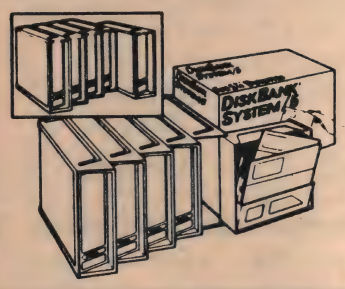

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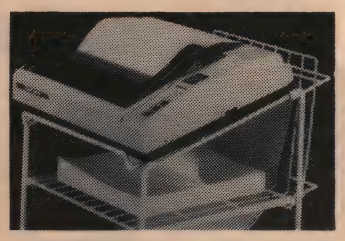

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program is memory resident. Memory Lane conflicted one of my existing memory resident programs, forcing me to remove them prior to running Memory Lane. It has no standalone mode. That means that Group L has removed Memory Lane from consideration from everyone who cannot afford 75K. One of Richardson's Laws states "A program should never be memory resident if it does not have to be." Richardson's second memory resident Law states, "Every memory resident program should have a stand-alone version unless a stand-alone version makes absolutely no sense, as is the case with keyboard macro programs."

To begin indexing, you press Alternate S with Memory Lane loaded into memory. If the files were created when Memory Lane was not loaded, you press F10 to go to the tools menu and press F9 to index all files. Note that Memory Lane will reindex files that have not changed since the last time they were indexed. To update the index, bring up Memory Lane and press F9 for the index menu and F9 to add file to index. Using this method, only files that were modified while Memory Lane was loaded into memory are reindexed.

Search

Memory Lane allows you to search for a text string up to 15-characters long and there is room about 10 character strings. While you cannot use any logical grouping in the search, the multiple text strings functions like OR statements. You can search all files, the same group you searched last time, or a list of files. The files can restricted further by the creation date and time and by the application program that created the file. Searching is very fast.

When matches are found, the search program will let you:

Browse through the file. It also has numerous options for moving through the file.

Print the file.

Other

While reviewing Memory Lane, I received numerous error messages. By itself this is not a fault, many of those messages were the result of my making a mistake. The Memory Lane error messages had two major faults, both exemplified by one of the error messages I got, "Show Stopper! Disk read err (sic) on vital file:" In addition to the misspelling, it does not tell me what vital file is missing. On a personal note, the last thing I want when a program fails to work is a flippant error message. Another error message was "Press any key to continue les (sic) indexed." I still do not know what that one means. And finally, "Schedule is corrupted; exiting..." This one gives me even less of an indication of why Memory Lane will not load than does the first error message.

It is a good thing Memory Lane is fast. You cannot simply copy files from the installation disk to your hard disk and run the program. For some reason (not copy protection) the installation program must do the copying and it destroys any existing index in the process. So any of these problems forces you to reindex all your files. Over the course of this review, I had to reinstall Memory Lane five times! And that meant I had to reindex five times.

The need to reindex all files when ever there is a problem, means that you probably would not want to use Memory Lane if you plan to index files not maintained on your hard disk.

Benchmarks

I used Memory Lane to index the 68-files in native format described in the ZyIndex section. It took Memory Lane only 4-minutes and 55-seconds to complete the indexing. Searches were too fast to time, generally taking less than one-half second.

Manual

The manual is only 24-pages. That is not nearly enough to explain how to use the program. In fact, if I had not used other indexing programs first I do not believe I would have been able to figure out the manual well enough to use the program at all.

Memory Lane has several major limitations. While they have all been discussed elsewhere, they are collected here:

1. Memory Lane is memory resident without adding additional functionality for being memory resident. It is unlikely that many users can spare the memory to run Memory Lane.
2. Extremely inadequate manual.
3. Misspelled and uninformative error messages.
4. Memory resident conflicts.

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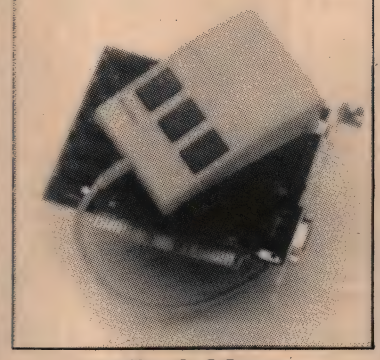

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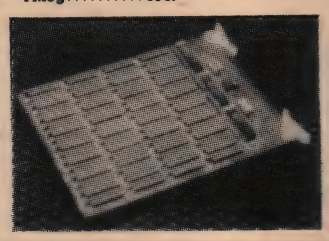

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SATISFACTION GUARANTEED

Document Indexing continued from page 293

For the life of me, I do not understand why Memory Lane is memory resident. There is nothing it will do that ZyIndex will not do better. The only thing that Memory Lane will do is let you search in the middle of another application. That is not an advantage that is worth 75K.

Memory Lane is not copy protected. It costs $99 and is available from Group L Corporation. The address is 481 Carlisle Drive, Herndon, Virginia 22070. The phone number is (703)471-0030.

FastFind Plus

Summary

FastFind Plus only works with ASCII files. Those ASCII files must be manually processed by the operator, like WordCruncher. Unlike WordCruncher, FastFind Plus is not intended as a research tool. It is intended as a document management tool. For this type of environment, the document preparation time is a large negative. FastFind Plus has little to recommend it over ZyIndex. It costs only a little less, yet ZyIndex will do much more using much less operator time.

Installation

FastFind Plus comes with an automatic installation program. The program will create the sub-directory \FF on the disk drive you specify and copy all the files to that sub-directory.

Indexing

FastFind Plus cannot directly index ASCII files, or any other type of files. As a minimum, you must add a #CARD statement to the top of the file and a #ENDCARD statement to the end of the file. The text between these two statements is treated semi-separately than the text between other pairs of these commands. In addition, the text between these statements must be 16K or less and have no non-printable characters.

```
FFINDEX BERNOULL    BERNOULL.ASC
FFINDEX BOTTLING    BOTTLING.ASC
FFINDEX BUG         BUG.ASC
FFINDEX CERTIFIC    CERTIFIC.ASC
FFINDEX COMPAQS     COMPAQS.ASC
FFINDEX COMPILE1    COMPILE1.ASC
FFINDEX COMPILER    COMPILER.ASC
FFINDEX COMPRESS    COMPRESS.ASC
FFINDEX COPYWRIT    COPYWRIT.ASC
FFINDEX DBASE3      DBASE3.ASC
FFINDEX DHINT1      DHINT1.ASC
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FFINDEX FASTBACK    FASTBACK.ASC
FFINDEX FIGURES     FIGURES.ASC
FFINDEX FILEFAC     FILEFAC.ASC
FFINDEX GOALSEEK    GOALSEEK.ASC
FFINDEX HAL         HAL.ASC
FFINDEX HARD        HARD.ASC
FFINDEX HARD2       HARD2.ASC
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FFINDEX M_TABLE3    M_TABLE3.ASC
FFINDEX M_TABLE4    M_TABLE4.ASC
FFINDEX M_TABLE5    M_TABLE5.ASC
```

Figure 1

FastFind Plus comes with a program, FFPREP, to aid you in this process. This program will strip out non-printable characters. It can search on specified text strings (e.g. page-breaks or <Return>) and automatically replace those with the card division commands. It can also automatically divide the document into 16K blocks. This is a step up from the WordCruncher method, which requires you to enter codes manually. FFPREP also allows you to combine multiple original documents into a larger document for indexing. These smaller documents would be divided into cards.

FFPREP is more difficult to use than it should be. It has no batch mode, so processing 68-files (as I did) requires loading each file and working through the menu to have the program automatically subdivide the file. If it had a batch mode, I could have entered something like:

```
C>FOR %j IN (*.ASC) DO FFPREP
    %J /16
```

As it was, processing 68-files took several hours. The shame is that dividing the document into these cards adds nothing to the features of the program, all it does is create more work for the operator. In addition, since you will not want to send out documents with #CARD statements in them, you will have to maintain two copies of a document or recreate the FFPREP processed document each time you need to reindex the document.

The first time I tried to index my test files, I misunderstood the directions. I thought you only had to divide the documents that were longer than 16K. When I ran the indexing program, it processed all the files. It took just as long as the actual indexing session. It gave no error messages. There is an error counter. This always showed zero. It created all the index files. Those index files were just empty. When I tried to search on those empty index files, the search program ran properly. All it did was return a 0-matches for each search. Nether program never indicated that the indexes had not been properly created. While I was able to figure out the problem, I rate this as unacceptable error handling. It is quite likely that new computer users would never even know they had a problem. It is even less likely that they could diagnose the problem.

Once you have the file in the format required by FastFind Plus, you run the index program, FFINDEX. This program can be incorporated into a batch file, however, this is not explained in the manual. Part of the batch file I used is shown in Figure 1.

The indexing program is SLOW! It required over twice as long as the next slowest package. This must partly be due to the way it operates. As it is indexing a file, it scrolls a lot of information to the screen. I do not want to see all this information. If I had not been timing the programs, I would have gone to lunch while they worked.

Search

The search program, unlike the indexing program, is menu driven with windows. You can only search one set of cards at a time, a good reason for combining smaller documents into one large set of cards. If each small document is stored separately, there is little advantage in having to search each document for the text you want with FastFind Plus over doing it with your word processor.

While not as powerful as ZyIndex, FastFind Plus does allow the use of logic in your search. It allows the use of AND, OR, and ANDNOT along with wildcards. While it does not have macros like ZyFeatures, prior search commands from the current session can be recalled and selected from a window.

Once you have found the text you are searching for, FastFind Plus allows you to browse through it, print it, or create a simple report including the ability to sort the information first. The report can be printed to a file or to a printer. By selecting different types of reports, you control how much information surrounding a hit is reported.

Other

The manual is very good. Its only flaw is that it lacks an index and does not explain how to index using batch files. One very useful feature is a list of all the files that exist as part of FastFind Plus and are created by FastFind Plus during indexing. This makes it easy to decide which files to delete.

Benchmarks

I used FastFind Plus to index the ASCII versions of the 925K, 68-test files. It took FastFind Plus over one and one-quarter hours to index the files. That time does not include the time it took me to mark the files for processing. This is just the raw processing time. The true total time was almost five hours. The resulting index files were the second largest in this review, 964K. Each 10K file resulted in slightly more than 10K of indexes, not including the original file.

Limitations

FastFind Plus has several major limitations. While they have all been discussed elsewhere, they are collected here:

1. Requires ASCII files with special markings.
2. Limited to 16K or smaller files.
3. Slow.
4. Creates large indexes.

Conclusion

For businesses, ZyIndex or OCRS offer more speed and power and they are in the same price range. For academic research, WordCruncher offers more power for less money. FastFind Plus costs $595 and is not copy protected. It is available from Creative Index, Incorporated. The address is 3325 North University Avenue, Suite 250, Provo, Utah 84604. The phone number is (801)374-8600.

Concludes next month. ●

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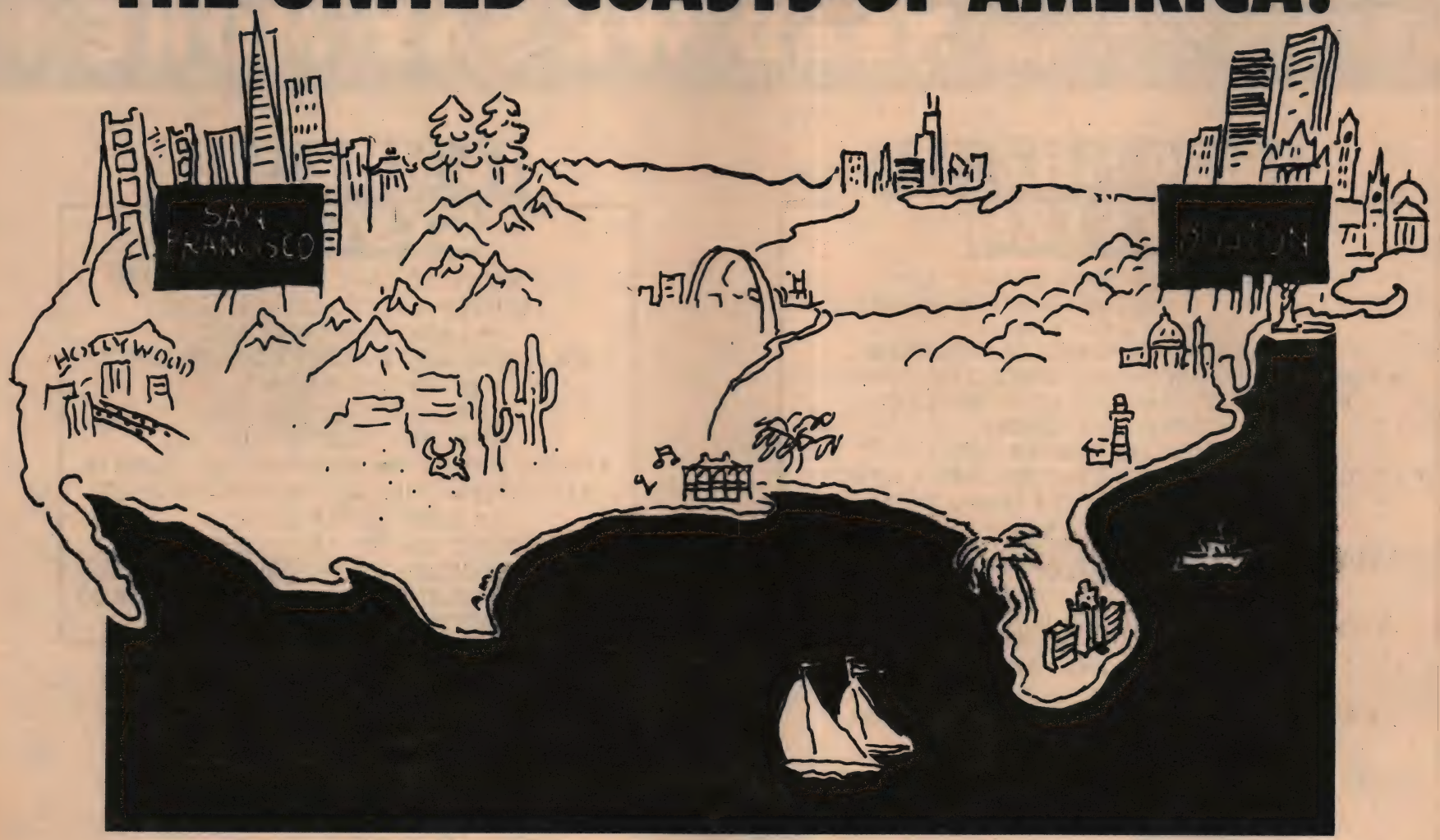

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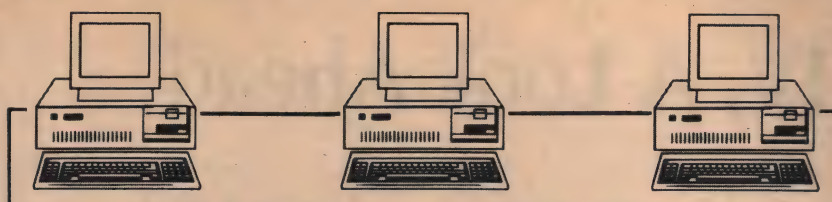

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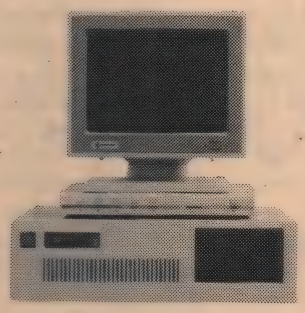

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Ashton-Tate's dBase IV, A Look Ahead

by Hal Nieburg

"How you goin' to keep them down on the farm (DOS), after they've seen Paree (OS)?" Will OS-2 become the industry standard for microcomputing?

The best way to judge its probable impact is to look at the new software products beginning in what is now a trickle, but will soon be a flood. OS-2 acceptance will, when push gets to shove, depend on whether new applications software, exploiting the advanced capabilities of 386 and 486 chips, will offer functions and features which users not only will want, but will not be able to do without.

Now that the new system is available, we are witnessing a steady stream of software and a growing hush among nay-sayers. Its capabilities are impressive, and the experts are beginning to concede that it will have a major role in the 1990s!

Successor To dBase III Plus

Enhanced speed and real multi-tasking will not be enough. What will make OS hum will be the creativity of programmers, who must take a quantum leap into the unexplored realms whose opening depends as much on imagination as on hardware.

Can the software companies, avoid the pitfalls of success, too many levels of clearance, too many committees, too much corporate caution? It is this tantalizing question that makes a sneak preview of dBase IV so fascinating! Does the sheer size and complexity of OS applications wed us indissolubly to corporate bigness? Or, will it take some lean and mean raiders of the lost art, whose names are still unknown and who can't get on regular company payrolls, to make the new operating system irresistible?

We get closer to an answer by talking to some of the people involved in dBase IV development. The company has made a determined effort to remain loose and free on the programming side, to encourage every original thrust, without regard for end products, and to attempt to keep alive the creative spark, even as it becomes necessary to embody some strands of research in a commercial product.

An early look at the emerging product and a talk with Roy E. Folk, executive vice president and general manager of Ashton-Tate's Software Products Division, convinces this observer that the OS version of dBase is a real grabber! Ashton-Tate made 245 enhancements, most of them major, to its dBase Language and integrated SQL to create the new dBase/SQL language. The software comprises some half million lines of code. New language extensions permit easy-to-use memory variables, two-dimensional arrays, multi-child relational capabilities, data validation, multiple display windows, support for international dates, currencies and numeric formats and many new math, financial and statistical functions.

Folk claims it is the highest-performance database management system ever designed for a personal computer. It will run on both OS/2- and MSDOS-based installations. In single-user mode, dBase IV requires an IBM PC, PC/XT, PC/AT, PC Convertible or all 100% compatible systems. It requires either OS/2 1.0 or PCDOS version 2.x or higher. Network systems need PCDOS 3.x or higher.

Minimum memory configuration to support dBase IV is 640Kb for dBase IV under DOS. For OS/2 protected mode, users need a minimum of 2Mb total memory. Minimum disk storage requirements are one 5¼ inch 360Kb or one 3½ inch floppy disk drive and one fixed drive. The program supports IBM monographic or color graphics including CGA, EGA and VGA. Most 80-column printers, including laser printers, will operate with dBase IV.

All previous versions are fully upward compatible and all data and program files supported by dBase III Plus can be used in dBase IV without modification in either DOS or OS/2 environments.

New Control Center

There are, according to Folk, major enhancements to the dBase programming language, seamless integration of IBM SAA-compatible Structured Query Language (SQL) and a completely redesigned user interface—including a new applications generator—that makes program development and data management much simpler for non-programmers. dBase IV includes a built-in, automatic program compiler that is 10 times faster than dBase III Plus. New automatic record and field locking capabilities provide for easy networked multi-user operations.

A Developer's Edition is also at hand, a complete dBase IV programming environment designed for use by applications developers and consultants. Edward M. Esber, Jr., chairman and chief executive officer, pointed out that the package "is the key to our workstation and workgroup DBMS strategy." "Beta sites, many of which have been deeply involved in the development phase from the beginning, are very enthusiastic," he said.

A brand-new Control Center replaces the dBase Assistant interface, enabling users, even those with absolutely no programming knowledge, to perform data entry, query and report generation without writing programs. Users simply specify the files, forms and tasks using a What-You-See-Is-What-You-Get or WYSIWYG work surface. dBase IV automatically handles all programming. For advanced users, dBase IV still supports the familiar "dot prompt" command interface.

The Control Center consists of six on-screen graphic panels. Each panel provides menu-driven access to file management, database queries, forms creation, report generation, label design and a complete application generator.

"For the productivity user, dBase IV sets new standards for ease of use, power and performance. The new interface allows users to perform tasks, even generate whole applications, without writing any programs," Folk said. "The new dBase IV Developer's Edition provides a complete development, test and distribution environment for single and multi-user applications. It even includes an applications module for royalty-free distribution of turn-key custom database application programs."

For novice users and experienced programmers alike, dBase IV's new applications generator shortens valuable development time. Users merely define tasks and the files to use. The applications generator then ties them all together. Users can also add pull-down and pop-up menus with the WYSIWYG menu editor. When finished, dBase IV generates all the program source code.

A "Quick Application" option gives novices a pre-defined application in minutes. For advanced developers, a template language is provided for sophisticated customization of complex applications. All source code produced is available for analysis and modification.

With a new forms manager, users can visually lay out data entry forms on the Control Center's work surface. The full-screen editor allows users to

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dBase IV
continued from page 298

design and modify forms with advanced features such as pre- and post-processing for powerful data entry validation and look-up capabilities. Later, forms are called up by name for interactive and program usage.

SQL is here with bells on! Ashton-Tate has integrated IBM's SAA-compatible Structured Query Language (SQL), a simple yet powerful English-like relational database sub-language, into the dBase programming language to create dBase/SQL. dBase/SQL is the new programming language for dBase IV and will be an application programming interface for the Ashton-Tate/Microsoft SQL/Server.

With the dBase/SQL programming language, users can create, modify and query databases using SQL commands or traditional dBase commands. Users can interactively execute dBase/SQL commands at the dot prompt with the results displayed immediately after each command. With dBase/SQL, users create dBase IV programs that include SQL statements freely intermixed with dBase statements.

The SQL facility contains tools which help users retrieve, organize, edit and display data. It features Query-By-Example, or QBE, an easy-to-learn interactive query system which automatically relates data from two or more databases. By citing data example, the user tells the QBE system what information to extract, but not how to extract it. QBE displays "logical views" of data that appear on screen as if two or more files had merged showing only the requested data. The physical files remain unchanged.

There is also a new report writer which uses the same work surface, operating graphically in the manner of a desktop publishing system. It incorporates a "band" concept allowing users to easily define sophisticated groupings of data and easily generate reports. These reports include simple columnar reports, complex multi-file reports with rich page layout facilities and fonts, preprinted form reports and mail-merge reports.

The new program contains also its own built-in program compiler that increases execution speeds to more than 10 times faster than dBase III Plus. All "dot prompt" commands and dBase IV applications are automatically compiled when first run.

Networking

These capabilities are significantly enhanced. Single-user dBase III Plus and dBase IV programs will automatically run as multi-user programs without modification. In network mode, (units require at least 640Kb memory), all the most popular systems are supported, including Novell Netware/286 versions 2.01A; 3COM 3+ Share Software versions 1.01, 1.1 or 1.2; IBM PC LAN Program version 1.10, 1.2 or later including Token Ring (NETBIOS version 1.0 or later); AT&T StarLAN version 1.0, 1.1 or 1.2; and Ungermann-Bass Net/One PC version 15.2.

There are many striking multi-user enhancements. For example, dBase IV network mode permits automatic record and file locking when users attempt to access the same information simultaneously. Supported is transaction processing with complete rollback and recovery to prevent data loss during a system failure or record lockout. Automatic screen refreshing improves user concurrency by updating common screens every time another user of the same screen makes a change. In addition, networks can imbed eight-layer password protection and data encryption.

The OS release carries a suggested retail price of $795. The suggested price of dBase IV Developer's Edition is $1,295. The regular upgrade price for any user of dBase II, dBase III or dBase III Plus is $175. Folk noted that the company will not abandon old users. dBase III Plus will continue to be sold and supported.

The shape of things to come at Ashton-Tate, whose OS-based database version (now beta-testing) is due for release in July 1988, provides an important indicator. Such releases will have a dual role in an age of uncertainty. If dBase IV, and other DOS classics, like 1-2-3, bring to the personal computer smashing breakthroughs in power and convenience, features that previously could only be offered on a mini or mainframe, they will establish, not only their own future viability, but that of the OS environment itself!

After this early glance at the new release, I am splashing my dressing! I cannot help thinking that the OS-2 revolution is now well underway and will not be stopped! ●

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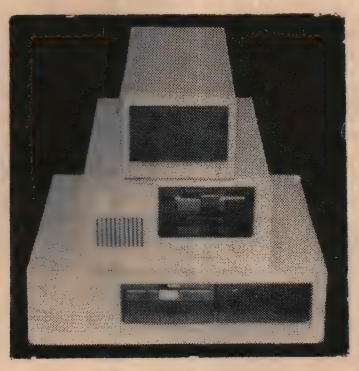

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The Many Facets Of GEM—Part 11

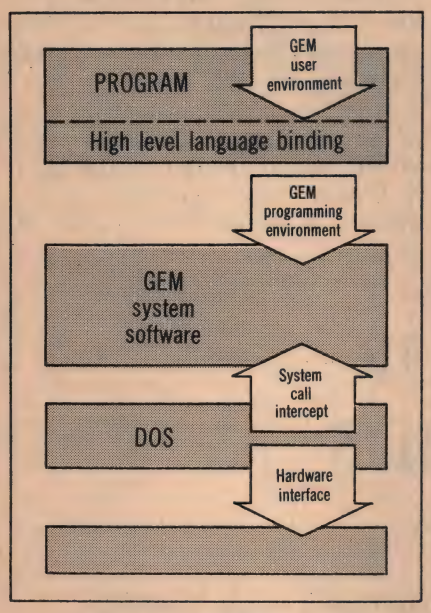

Figure 1: The GEM Memory Map

by Peter Ruber

The Many Facets of GEM was originally conceived as a series of five or six articles for *Computer Shopper* but quickly doubled in size. It could easily perpetuate itself ad infinitum because there are so many GEM-based applications available to keep me chained to my Logitech Mouse for years to come.

There are 800 software developers world-wide working on GEM-based applications for the IBM PC compatible and Atari ST computers. 400 GEM-based applications are available, not counting those written for GEM DOS running under the Atari ST and Atari Mega ST computers. According to some recent estimates, one in ten computer owners is a GEM user. More than 2.5 million software packages have been sold.

This makes GEM a software concept to be reckoned with. GEM applications comes with a wide range of subject categories, including Accounting, Artificial Intelligence, CAD/CAM, CASE, Communications, Computer Languages, Databases, Desktop Publishing, Financial, Graphics, Manufacturing, Music, Office Automation, Project Management, Robotics, Simulation, Spreadsheets, System Software, Training, Utilities, and Word Processing.

Most of the articles in this series are about Digital Research's own GEM business presentation graphics applications. Two others (GEM FontEdit and GEM Superbase) were developed by GEM licensees and were included to demonstrate that the GEM concept can be easily adapted to nearly every software category. Many GEM applications are available in both PC and Atari ST versions. DRI's GEM applications were ported to the Atari in 1987 by ABC Trading, a major European software developer headquartered in the Netherlands. As of this writing, negotiations are underway to distribute them in the US to Atari owners.

While working on the last GEM application for this series, I realized I had become so involved that I had neglected to present an overview of the GEM operating environment. In order to correct this oversight, I have prepared as my final volley a brief history on GEM's origins and an outline of its functional components.

Although the GEM series ends as a regular feature, I will be reviewing important new GEM products from Digital Research from time to time. I will also be switching gears next month to launch a six-part series called GEM On The Atari, which I hope will not infringe upon the regular Atari columns in *Computer Shopper*, but add to them.

I am confident as ever that the graphics-based concept of GEM has arrived and is here to stay. You will find within the next year or two that the bulk of new software applications coming onto the market will be heavily graphics oriented and will run under GEM, Windows or XWindows. With EGA graphics now entrenched as the standard, and hi-res EGA (VGA) due to take over within a year, more and more applications will take advantage of high resolution colors and graphics.

Even such standard dinasours as Lotus 1-2-3 and dBase will be revised to accommodate a graphics-based interface. There are still a few problems relating to speed in executing certain "save" and "output" commands, but even GEM allows for a direct CTRL key operation that bypasses the "mouse-click" function.

As a hint that character-based applications are moving into a graphics environment, Digital Research has released on a limited basis to OEM's in Europe an interesting product called GEM XM Desktop. At the moment it is a memory-hog and the architecture is being redesigned by their U.S. engineers to reduce its memory demands. It is slated for release in the 3rd quarter of 1988, or sooner.

GEM XM Desktop is a program-switching productivity aid for PC/MSDOS, DOS Plus, Concurrent DOS, etc. It allows up to twelve GEM and DOS programs and desktop accessories to be active on IBM PCs or compatibles. It requires a hard disk and can use expanded memory as a RAM disk. It works exactly the same way as GEM Desktop, with the additional capability to load and run GEM-based and DOS programs such as Lotus 1-2-3 and dBase from a drop-down menu. DOS programs run in their normal environment, but GEM XM Desktop's menu of installed programs and accessories is available in character form in the DOS environment at the press of a "hot key," allowing the user to select any of the listed programs without restarting GEM XM Desktop. If a GEM-based program or accessory is selected, the GEM user environment is reinstated. A program may be terminated at any time during operation to run another. On reselecting the original, it resumes operation at the point of departure, with data and screen in the same state.

The GEM Concept

Digital Research's Graphics Environment Manager GEM is the system software behind a highly visual method of controlling computer programs. GEM-based programs have an object-oriented user environment. Object means images on screen, and user environment defines the way in which the user controls the program.

What has made GEM so successful is that the user environment has a consistent quality in all GEM-based programs whatever their source or origin. When you have mastered one GEM-based application, you find that the same techniques of program loading, file retrieval, document output, and so forth, apply to all programs. Once GEM Desktop or the GEM/3 Desktop system manager has been installed with the device drivers that recognize the type of hardware you have in your computer (memory, graphics card, monitor, serial and parallel ports, mouse or other pointing device, printer, etc.) no further system configurating is necessary no matter how many different GEM applications you have. If you upgrade your equipment, a simple installation of the appropriate device driver gets you going in minutes.

This consistent user environment makes it easy for novices to master several sophisticated applications very quickly without going through an extended learning process. Moreover, modules, elements and graphics from one GEM application can easily be transported to another. And, with GEM's ability to convert files from many popular programs such as Lotus 1-2-3, dBase, Wordstar, Symphony, Multimate, SuperCalc, etc., users not only protect their investment in this software, but can make their documents more meaningful with certain GEM applications.

Graphics files produced by standard GEM-based programs come in two formats, identified by the filename extensions .GEM and .IMG. The .IMG format is used by GEM Paint, GEM Snapshot (an accessory in the GEM Desktop output file) and GEM Scan, and consists of a pixel-by-pixel bit image. .GEM files use the GEM VDI metafile format and contain graphics instructions enabling GEM to draw the picture represented. The majority of GEM-based graphics programs use this file format. The existence of these common file formats enables pictures and presentations to be produced using the editing

continued on page 302

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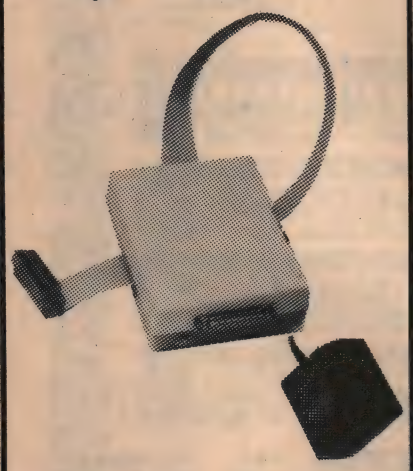

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Many Facets of GEM

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functions of more than one GEM-based program.

The Origins Of GEM

The GEM user environment was derived from an investigation of human/computer interactions performed by the Xerox Palo Alto Center (Xerox PARC) in California in the early 1970s. The results of this research have also been exploited elsewhere, notably in the Xerox Star and the Apple Macintosh, by Microsoft's Windows, and by the computer center at M.I.T. who developed Xwindows which is widely used by engineering workstations.

With the 1984 launch of GEM, Digital Research opened the results of the Xerox PARC research to manufacturers of IBM and IBM-compatible personal computers, and to software developers (including Xerox) through a licensing agreement. GEM is a standard, non-proprietary product which does not communicate directly with the hardware. Interfacing to hardware is properly the role of GEM-compatible operating systems such as MSDOS, PCDOS, IBM's OS/2 and the IBM Presentation Manager, and Digital Research's own Concurrent DOS-XM, Concurrent DOS 386, DOS Plus, GEM DOS and CP/M-86. GEM will be running in IBM's OS/2 in both the 80286 protected mode (in which several GEM applications can be multi-tasked), but also in the DOS compatibility box.

Multi-tasking of GEM applications can also be accomplished by SMARTSCREEN, an enhanced version of Concurrent DOS 386 developed by Concurrent Controls, Inc. These operating systems include hardware interface module which are uniquely configured by computer manufacturers for their equipment.

Originally developed by DRI's British division, the GEM Graphics Environment Manager was first adopted by Acorn, ACT (later called Apricot), and ICL, who were soon followed by Siemens and Xerox. In 1985, while developing their own GEM software applications, DRI adapted GEM from the Intel 80xxx microprocessor to the Motorola 68000 CPU used in Atari's ST series, with an operating system based on GEM DOS. GEM DOS is a GEM-inclusive derivative of CP/M-86.

GEM didn't begin to garner a snowballing effect until the fall of 1986 when British manufacturer Amstrad launched a line of low-cost PC compatible computers bundled with DRI's DOS Plus operating system and assorted GEM applications. Almost 1 million Amstrad PCs have been shipped since then. They are now entering the major US distribution channels. Amstrad's bold initiative helped to bring GEM applications into a competitive price range.

How GEM Works

By steering clear of hardware means that GEM can be easily adapted (or ported) to any machine which supports any GEM-compatible operating system. Although GEM provides the user environment for GEM-based programs, GEM is not a part of any program. As system software, it lives in the microcomputer's memory above the operating system and acts on requests for services made by the currently active program. See Figure 1 page 316.

GEM service requests are written into programs during or after coding of their basic functions. GEM also intercepts operating system requests and calls GEM service routines as necessary to maintain the GEM user environment at all times. These GEM service routines are activated via interrupts. Interrupts are system calls which temporarily suspend current activities to enable the CPU to devote its attention elsewhere. For example, to issue error messages or to update a clock display. By working at the interrupt level, GEM avoids having to be integrated with programs or operating systems which would considerably reduce its independence and make it highly labor-intensive to transfer to new machines.

Apart of adding routines to request GEM services to a program functions, the GEM programmer must add an appropriate language binding, which is a further set of routines which converts requests from the program into the correct format for reception and execution under interrupts by GEM. Language bindings are available from Digital Research for C and Pascal; others are available from language vendors or may be written by any competent programmer. Programmers will also need the easy-to-use GEM Programmer's Toolkit.

The control concept provided by GEM-based programs is DRI's GEM Desktop, whose function is to hide the operating system command environment from the user. Its typical activities are file handling, program loading and disk management. The visual images or object in GEM Desktop and other GEM programs comprise of icons, windows, menus, the pointer and other items. Icons represent resources which may be accessed directly, and ususally have designs related to the functions they represent.

The Icons within GEM Desktop are:

The Folder—This looks like a file folder and it represents a disk sub-directory.

The Program—Application icons reflect the purpose of the application, such as word processing, drawing or other programs.

The Document—These are user files which must be loaded by programs.

The Floppy/Hard Disk Drive—This represents the root directory of the default disk drive where Folder, Programs and Documents reside. These icons are graphic representations of your typical disk directory. An option within GEM Desktop also allows you to display this directory as a text file, which can be sorted by date, alphabetically, or by file type.

GEM Windows

A GEM window contains program output. Features of the window include a "butterfly" at the top lefthand corner which is used to close down the window. If the user closes a disk sub-directory in GEM Desktop, the window is replaced with that of the parent sub-directory. Repeating this action soon brings up the disk's root directory. Closing the root directory recreates the disk drive directory containing icons representing the root directories of all the currently installed disk drives.

GEM windows also have "sliders" on the right and bottom portions of their frames. These enable the user to scroll the contents of the window vertically or horizontally, as applicable. The windows may also be expanded to full screen size, or contracted back to half-screen size by activating a feature at the top right, the small black diamond. Most GEM programs can maintain a number of windows on screen, representing currently open files containing text, graphics or data. Such programs usually support pointer-driven cutting or copying and pasting between these windows and also the corresponding files.

The Menu Bar along the top of the screen shows the current major options. Drop-down menus fall from the menu bar when an option is activated, to show further options. It closes automatically when another resource is accessed. There are also Alert Boxes which contain advisory or error messages to the user, with options to proceeed indicated by "buttons," which when activated, produce the desired action—such as OK to proceed, or CANCEL to cancel an operation.

Activating Program Resources

All items which may be activated can be done so by the pointer on screen. The GEM software continually issues interrupts to check whether the user's mouse or other pointer device has been moved. If so, it moves the pointer appropriately on the screen and registers the new position. GEM also keeps track of the position of objects, icons and menus and detects when the pointer coincides with one or other of them. The pointer is represented in different forms depending on the function. It can be an arrow when activating the drop-down menus, or a hand when selecting options in dialog boxes. It can even be a cross-hatch in a circle when you access or drag construction resources from the toolbox to your working window.

In the case of the menu bar, simple coincidence with an item on it causes a secondary menu to drop down from that item. For all objects other than the menu bar, coincidence is not enough. A pointer device button must be pressed (clicked) once or twice for the resource to be activated. Icons and drop-down menu items are selected by clicking on them. Sliders are brought into play by clicking on a shaded portion of the window-frame. Dialogue boxes are complied with by clicking on the "Cancel," "Retry" or "OK" buttons within. Clicking on a menu item selects it.

In some cases, holding down and "dragging" the pointer across the screen

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will cause relocation of single objects or selection of multiple objects, with corresponding action at the file level where appropriate. Dragging is particularly powerful when used in file handling. Dragging can be used to select and copy whole groups of icons and files between directories, or to delete them.

Once users understand the relationship of GEM's simple methodology, they have enough knowledge to find their way around any GEM program. GEM-based programs are easier to understand without formal training than menu or command-driven programs.

The GEM Programmer's Toolkit

The GEM Programmer's Toolkit contains all of the tools necessary to develop GEM user environments on Intel-based IBM PCs and 100% compatibles for programs written in virtually any high level language available for a range of operating systems mentioned earlier on.

Since the hardware-independent nature of the GEM system software means that GEM user interfaces may be easily ported (or transferred) between the Intel and Motorola worlds, GEM user environment files are object (compiled) code portable between processor families and source (high level language) code portable between them. Programs written in easily portable source code have a strategic advantage, because they can be ported from the PC to the Atari (and Mega) ST computers very quickly. DRI's massive GEM Draw Plus was ported to the Atari ST in under a week's work by a single programmer.

The GEM Programmer's Toolkit breaks GEM into four basic elements:

GEM—is the Graphics Environment Manager. This programming environment provides two sets of functions for controlling graphics device output and pointing device and keyboard input.

AES—is the Application Environment Services. This is a set of functions an application program uses to control the interaction between the user and the application. The AES manages icon selection, drop-down menus, dialog boxes, alert messages, and windows. The AES is grouped into twelve sets of related functions referred to as libraries.

VDI—the Virtual Device Interface provides graphics primitives for implementing graphics applications with reduced programming effort. Application programs interface to the VDI through a standard calling sequence. Drivers for specific graphics devices translate the standard VDI calls into the unique characteristics of each device, which provides device independence. The GEM VDI consists of two components: the Graphics Device Operating System (GDOS) and the device drivers and their associated font files.

The GDOS contains the basic host and device-independent graphics functions that can be called up by application programs. It allows application programs to access the GDOS in much the same way it accesses the operating system. The GDOS performs coordinate scaling so that applications can specify points in a normalized space. It uses device-specific information to transform coordinates into the corresponding values for a particular graphics device.

The graphics device drivers are similar to the drivers in an I/O system. They contain the device-specific code required to interface particular graphics devices to the GDOS. The device drivers communicate directly with the graphics devices, and the VDI requires a unique device driver for each graphics device in the system.

RSC—the Resource Construction Set is a GEM application that is used to create resources (menus, dialog boxes, alert boxes, etc.) that are not actually part of the program code, and as such can be used by non-programmers. Resources are made up of objects. "Object," in this sense, is the technical term referring to a specific set of images that can appear on the screen, including empty boxes, boxes containing text, text strings, and so forth.

To create a resource objects are combined to form an "object tree." The relationship between objects in the tree is described in family terms: the first object is the "parent"; the objects contained within the parent are the "children." The GEM RCS screen resembles an application window under GEM Desktop, complete with a Toolkit for designing icons to be used with GEM-based applications. The toolkit also contains icons for the various tools that can be used to "customize" the objects in a tree, such as changing the object's color, fill pattern, or alignment.

The GEM Programmer's Toolkit contains two additional components. The first is an adaption of KERMIT. Kermit is a protocol of transferring files between computers of all sizes over ordinary asynchronous telecommunication lines using packets, checksums, and retransmission to promote data integrity. Kermit is non-proprietary, thoroughly documented, well tested, and in wide use. The protocols and the original implementations were developed at Columbia University and have been shared with many other institutions, some of whom have made contributions of their own.

The second is GEM SID-86, a powerful symbolic debugger for use with PCDOS. It allows users to test and debug programs interactively using symbolic assembly and disassembly, expressions involving hexadecimal, decimal, ASCII, and symbolic values, permanent breakpoints with pass counts, and trace without call. The documentation for Kermit and GEM SID-86 is contained in the GEM RCS manual.

Some of the foregoing material was adopted from the GEM Programmer's Toolkit documentation and the GEM Software Directory published by Digital Research (UK) Ltd.

For additional information, please contact Digital Research, Box DRI, 60 Garden Court, Monterey, CA 93942. (800)443-4200. ●

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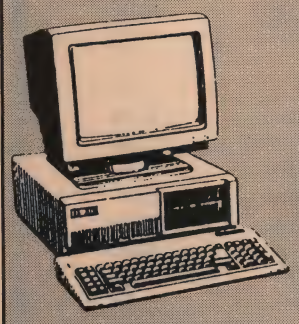

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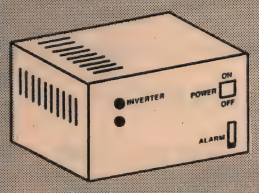

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Baker's Dozen: 13+ Handy Utilities

by Stephen B. Gray

ButtonWare offers eight utility programs that are extensive, easy to use, and reasonably priced. Two of them—PC-File+ and PC-Calc+—have been updated with heavy rewrites, and will be discussed at the end of this review.

Baker's Dozen is a fascinating new ButtonWare product, with one more than a baker's dozen (which traditionally is 13) of useful utilities. The big ones are a powerful mini-spreadsheet and a dangerous disk utility, along with others that give you a calendar, file compare, keyboard ASCII table, locator for files and strings of text, sideways printing, sorting of text files, redirecting of printer output to a disk file, easy removal of directories, setting screen colors and border, taking pictures of your screen and saving them to a disk file, swapping LPT1 with LPT2, and swapping COM1 with COM2. There's also an extensive manual for these utilities, none of which are copy-protected.

Although the spreadsheet is called "mini" because it takes up only one page, it has as many features as some bigger ones. So many, in fact, that they take more than a quarter of the text to cover (the disk utility takes another quarter).

Because it's a 6-by-20 spreadsheet with a large variety of functions, ButtonWare chooses to call it Button-Calc, and says, "You can use it for small spreadsheet jobs or as a calculator. You will be surprised at its functionality and versatility." Yes, you will be, to find so much crammed into it. You should be able to run Button-Calc in 256K.

This mini-spreadsheet is the personification of user-friendly, to the point that you won't need the manual much at all. Press <F1> and you get the Main Help screen, which shows what each of the function keys can do for you, how to move the cursor, etc. Press <F2> to get a description of the functions and operators. Press <F3> to see how to perform all the special operations such as move, copy, etc. With just these three screens, you find out how to do 50 things in Button-Calc.

As an example of how simple this utility is, take a look at the <Control><S> function, which allows you to set the screen colors. Just press <F> repeatedly to cycle through the foreground colors, and <B> to cycle through the background colors, on the edit line at the lower left of the screen. If you like any combination, press <F10> and the entire screen will change to those colors. If you want to stay with the original colors, just press <ESC>.

Button-Calc supports range names, which are mnemonics you can define using <CTRL><N>, to simplify writing equations. A short mnemonic such as "FLOW_#1" could be used in place of a long line of mathematical operations. You'd always know what the range name means, because it's displayed in the Edit Line along with its corresponding cell definition.

You can save, recall or get part of a Button-Calc file. You can move, copy and sort data. You can insert and delete rows and columns. You can make calculations based on date and time. You can use factorials, combinations and permutations. You can do hex to decimal conversions. In addition, Button-Calc supports IRR (Internal Rate of Return), NPV (Net Present Value), standard deviation, and other normal business functions. It also provides trig functions (including hyperbolics) and looping capability, and checks equation syntax.

Although a disclaimer says, "Button-Calc is not meant to replace your spreadsheet," it goes a long way toward doing just that, if you can make do with a 6-by-20 model.

Because Button-Calc and Diskutil are so extensive, they get separate indexes; the remainder of the programs are all included in one index.

Diskutil is the most powerful program on the floppy, and is dangerous because it gives you almost complete control over all aspects of your disk storage. The manual warns against modifying the FAT (File Allocation Table) unless and until you understand it. Browsing or working on scratch disks is recommended for the neophytes.

With Diskutil you can change the Date and Time of files or directories, change the attributes of any file, modify or add disk labels, browse through any disk file or directory, modify any disk file or directory, browse through the FAT, modify the FAT, search for any string on the disk anywhere, restore a lost file, remove directories, discover the attributes of a disk, produce a directory map, find out where any sector is located on your disk, determine the space required for a group of files, send any or all information to a disk file or printer, create .BAT files for later operations, etc.

Button-Calc and Diskutil alone would be well worth the $59.95 price of Baker's Dozen, but you get a dozen more utilities.

The Calendar utility is very extensive, and can display Jewish or Chinese years, along with the animal for the Chinese year.

Filecomp can save you a lot of time in text preparation, because it compares two ASCII TEXT files in much more detail than possible with the COMP.COM provided by DOS. You get the number of lines that match at the beginning and end of the files, the unmatched line numbers and lines (optional), and a mapping of matching lines with data (optional). Blank lines are ignored.

Gkey is used mostly by programmers and is fun; it lets you see the full ASCII character set with each character's hex value or decimal value, or the key values sent to your PC when a key is pressed or released, or the full scan code returned by Interrupt 16h to your program for every keystroke normally supported by your PC.

continued on page 306

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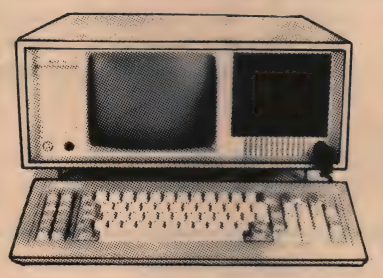

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Baker's Dozen
continued from page 304

Locate is the most useful of the shorter programs on this disk. With it you can find where any file or group of files is located on your disk, beginning at the root directory or any directory of your choice. You can find strings of information in any file or group of files anywhere on the disk. You can display your findings by file name only, by file name and line number, or file name, line number, and text display. You can perform case-sensitive and case-insensitive searches. You can direct the results to your printer or any file.

P90 is a great help when printing spreadsheets, because it prints your data at 90 degrees. That is, if you use a dot-matrix printer, or a laser printer with dot-matrix emulation.

PC_Sort lets you do more than the SORT utility provided by DOS. It lets you sort a file as big as your memory will allow, on multiple keys, with up to four fields overlapping, with case-sensitive or case-insensitive fields, and in ascending or descending direction for each field.

There are six more utilities in Baker's Dozen, but space doesn't permit going into detail on them. If you're enough of a computernik to be interested in what's under the hood, you'll find this collection well worth the money.

If the 6-by-20 Button-Calc spreadsheet isn't big enough for you, try PC-Calc+, which has 255 columns; the number of rows depends directly on the amount of memory and varies indirectly with the number of columns used.

While Button-Calc has 12 trig functions, 13 business functions (such as internal rate of return), and 17 miscellaneous functions (such as ROUND, EXP and MOD), PC-Calc+ has 15, 14, and 20, respectively, including the Bessel function.

More than 70 new features have been added to this update, and the load, save and recalculation features are two to five times faster than before. PC-Calc+ includes graphing, split screens, DOS access, support for 8087 and 80287 floating-point processors, sideways printing (on a dot-matrix printer), 200 context-sensitive help screens,and importing date from PC-File+ databases.

PC-File+, Version 2.0, includes more than 30 new and enhanced features, and supports summary graphics with the ability to create horizontal and vertical bar charts, and line, scatter and pie graphs.

A calculator hot key has been added; calculations may be performed at any time, and field data can be used in hot-key calculations. PC-File+ now detects and uses an 8087 or 80287. There are more password options, and the passwords are now stored in an encrypted file.

The maximum field size has been increased from 65 characters to 200, the maximum record size from 1665 characters to 300, and the maximum number of macros from 12 to 22. Reports can now contain field data in headers, footers and subtotals. And PC-File+ now supports date arithmetic.

PC-Calc+ is $69.95; registered users of PC-Calc can update for $25. It requires a minimum of 280K of available RAM, and for graphing, a CGA, EGA or VGA adapter or Hercules monochrome card.

PC-File+ version 2.0 is $69.95; registered users of previous versions can upgrade for $30. It requires MSDOS or PCDOS 2.0 or higher (3.0 or higher to drop to DOS), and 384K of available RAM.

PC-Calc+, PC-File+ and Baker's Dozen all require an IBM PC or very compatible PC, and two double-sided disk drives or one double-sided disk drive and a hard disk.

Baker's Dozen requires 256K of RAM, and MSDOS or PCDOS 2.0 or later. It is $59.95, plus $5 for shipping and handling, from ButtonWare, Inc., Box 5786, Bellevue, WA 98008. Telephone 1-800-J-BUTTON for orders, (206) 454-0479 for business.

Baker's Dozen, PC-Calc+ and PC-File+ have all been released as Shareware, and can be found on electronic bulletin boards. Copyright laws apply to Shareware, and users are expected to pay a registration fee (which is not minimal), which gets you a manual and technical support. ●

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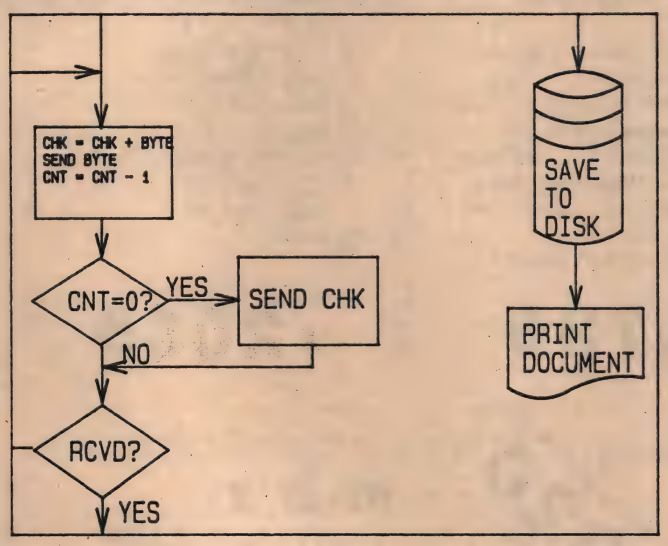

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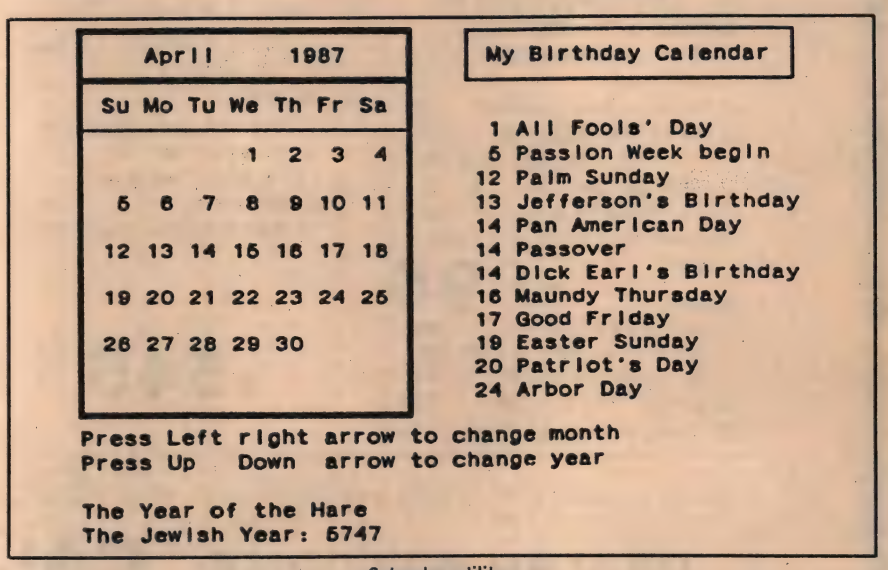
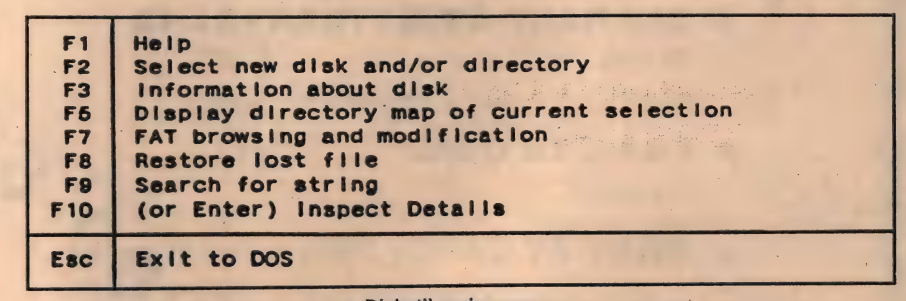
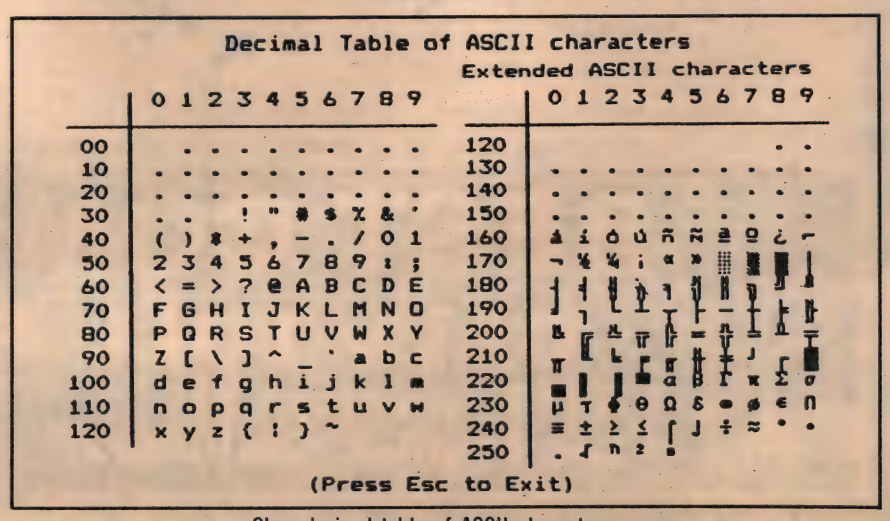

April 1987
Su Mo Tu We Th Fr Sa
1 2 3 4
5 6 7 8 9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30
My Birthday Calendar
1 All Fools' Day
5 Passion Week begin
12 Palm Sunday
13 Jefferson's Birthday
14 Pan American Day
14 Passover
14 Dick Earl's Birthday
16 Maundy Thursday
17 Good Friday
19 Easter Sunday
20 Patriot's Day
24 Arbor Day
Press Left right arrow to change month
Press Up Down arrow to change year
The Year of the Hare
The Jewish Year: 5747

Calendar utility


F1 Help
F2 Select new disk and/or directory
F3 Information about disk
F5 Display directory map of current selection
F7 FAT browsing and modification
F8 Restore lost file
F9 Search for string
F10 (or Enter) Inspect Details
Esc Exit to DOS

Diskutil main menu



Gkey decimal table of ASCII characters

Oracom: A BBS For All Seasons

by Ron Albright, MD

One of the "rites of passage" for any telecommunications junkie (of which group I consider myself a charter member) is to set up a bulletin board system of our own. At least temporarily. With its release of the Oracom multi-user bulletin board software, Surf Computer Services has made setting up a personal or business communications system even more appealing and much simpler. If you have an IBM or compatible computer with 640K memory, a hard disk drive and a Hayes or clone modem, you can set up a full-service BBS in just a few short hours.

But don't be fooled. Oracom is one of the most powerful host communication packages available. It can support up to 10 users simultaneously (with Digicom's Digiboards) through a built-in multi-tasking and windowing environment. It can be used for a public BBS or configured, through several levels of sophistication, as a complete commercial network. With these features, it can take credit card orders, keep track of usage for multiple user accounts and billing (you can even set up "prime" and "non-prime" time billing). It can even display custom logos in ANSI format. With its unique "matching" database, Oracom allows for questionnaires (multiple-choice or essay) and can be configured to allow users to search for others with similar interests based on these responses. Like Fido-NET, Oracom can be linked through a national "Oralink" network.

Oracom makes maintenance of the BBS simple. The Sysop can set up automatic message deletion after a certain period of time, and account deletion after a set period of inactivity. Oracom can even automatically update the BBS file directory after a new upload.

Setting Up

Oracom comes on two disks with over a 100 pages (gratefully, well-indexed) Sysop manual and a 56 page User's manual. You must change your "CONFIG.SYS" file to include the statements "FILES = 20" and "BUFFERS = 20" and reboot the computer, prior to running Oracom.

Once your system has been reconfigured, setting up is a snap. You create a directory on your hard drive for the software, and copy the files from both disks into that directory. Then, you run an auto-extracting program called "STARTUP" which blossoms out into all the data files and utilities. The total system at the start takes up under a megabyte of hard disk space. You start the software by typing "ORAxxx" where the "xxx" designates your unique software node number.

I have previously set up (well, sort of) and run a Fido-BBS for a short period of time. And earlier, I had failed at trying to set up a RBBS—it just wouldn't run with my modem. I gave up the Fido because, again, the modem and the software were not friendly. The Fido BBS refused to hang up the phone if a user just disconnected and did not go through the proper logoff procedure. It was not a problem with the software, it was the modem. But I had neither the funds or the inclination to buy another. I mention this only because I faced, with dread, the possibility that Oracom would be the same bad dream—flipping and re-flipping the DTR and other assorted dip switches, and changing modem commands over and over. Then, calling and recalling the system to see if it would hang up on me when I rudely disconnected on it. It didn't happen with Oracom. While the software is stringent with its memory and hard disk requirements, it does not appear to be so choosy with its modem specifications. With the rising sales of non-Hayes, clone modems, this is a real plus.

continued on page 308

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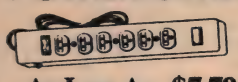

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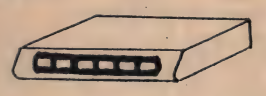

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VM/386 Brings Mainframe Technology To Your Desktop

by Peter Ruber

The arrival of Intel's 80386 32 bit microprocessor, with its Virtual Address Mode, its Protected Mode, and its Memory Management Unit, has sparked the development of a new generation of computer control programs. These control programs demonstrate interesting and innovative ways of providing multi-tasking and multi-user solutions for the power user. While, in my view, the most important of these is Digital Research's Concurrent DOS 386, because it is a true operating system boasting multi-user and multi-tasking capabilities, other programs offering original concepts have been arriving, and they deserve to be evaluated on their own merits.

This article launches an informal series that will explore some of these programs over the next few months. The first of these is IGC's VM/386. Later articles will cover Kimtron's MOS30/32, Virtual System's Quick Connect, The Software Link's MOS/386, and others.

Beyond Multi-Tasking

VM/386 could well become one of the more interesting product concepts of 1988. It's not an operating system like MSDOS. It's not a multi-tasking environment like Windows 386 or DESQview. VM/386 is the ultimate control program that literally carves your desktop computer into separate clones. It allows multiple operating systems, multi-tasking environments, multiple graphics programs, to function concurrently within your computer as though you were sitting in front of a desktop of 386 PCs.

The "VM" in VM/386 stands for "Virtual Machine." It was inspired by IBM's highly successful mainframe VM/370 operating system, which was introduced more than 15 years ago. By combining this proven mainframe technology with the advanced architecture of the 80386 microprocessor, VM/386

continued on page 312

Oracom
continued from page 307

Once Oracom has been installed and started, the Sysop has the option to start one or more available phone lines, set the status or "Sysop CHAT" (whether you want to be beeped if a user wants to ask a question while online, or see the line usage statistics. The Sysop may also, at any time while the system is running, disconnect a user on any single line, make a single line busy, or shut down the system. An added feature is the ability to broadcast a message to all users. This can be particularly useful if you have a multi-user board and plan to warn all those connected that you are going to stop the system. You can tell them to finish up what they are doing and log off.

When run for the first time, a Sysop can set up a multitude of options and defaults. He can add, change or delete message boards (Oracom can handle up to 30 separate boards), toggle the printer log, backup the BBS files in various ways (including saving deleted messages, if desired), set the days to delete inactive accounts or old messages, activate the billing logic, and a mind-boggling array of other parameters. While the options are incredibly diverse, they are all set from a simple menu system and fully explained, one by one, in the Sysop Manual. Once set, the default file is updated. From then on, you need access these menus only to change the BBS. Of course, all configuration and Sysop functions can be performed remotely.

Logging On

For the new users, Oracom access is simply a matter of entering a 4-8 character account code, a 6-8 character password, and a name or "handle" of 1-20 letters. The handle you choose is how the messages you send and receive will be addressed. Oracom then asks you for your city and state and a description of yourself. Your entry here can be anything you want others to know about you—your interests, job, computer, etc.—anything up to 3 lines, 64 characters per line. Other users can then see this information by using a "Who are the users" command when they check in. It serves as a nice way to introduce yourself to others.

After Oracom checks to see if you are correct with your account name and password, you are presented with a new user message. The one that came with the disks is:

MESSAGE TO NEW GUESTS

Oracom has many boards. You can see the boards listed and make your choice by going to the Board Selection Menu. You can reach that menu by entering "B" at any main command line prompt(:)

You will have to answer the questionnaire before you can access any of the boards.

The three most helpful commands to new users are:

? = Gives you the available commands at that point in the program.

H = Displays one of the many help messages explaining how to use the system.

CONTROL-K = Aborts whatever is happening, cancels your last command and returns you to the main command line.

Have fun, meet new friends, and keep calling back!

New users are then offered a demonstration of the Oracom BBS. The presentation is extensive and it is a good idea to save to disk or print it out on your printer. It covers everything from how to navigate the BBS to reading your mail, leaving messages and downloading files. Of course, a Sysop can modify this file as he chooses with a simple ASCII editor.

After the demo, you are given the following:

Welcome to the new Oracom.
Press [RETURN] to continue; N for nonstop; or K for main menu:
Users Currently Online
Line Account Cmnd
1 ALBRIGHT
1 of 3 lines in use.
Messages TO you:
No Messages
Do you want to see what is on the NEXT board (Y/N)? n
Oracom TeleHEALTH 1 Main Command Menu
R—Read a message
E—Enter a message
W—Who are the other users
M—Matchmaker
B—Board Selection Menu
T—Tutorial: How to use this BBS
[RETURN]—for remainder of the menu
ALBRIGHT: Just logged on. 1 lines in use.
03/27 09:47 1min Personal Mail Board (#1)
What next? <= I pressed <CR> here
S—Summary of messages
N—Change name/description/password
C—Chat with other users or Sysop
H—Display HELPful instructions
G—Goodbye
03/27 09:47 1min Personal Mail Board (#1)
What next?

I won't go through all of the menus on Oracom, but you get the idea. The user interface is superb.

Support is available online on Oracom #1, which is online 24 hours per day and available to all as a demonstration at (818) 509-9681. Sysops of Oracom systems have access to a Sysop SIG on this "mother" BBS where trouble-shooting and fixes can be exchanged. Cost for the software is $200-400, depending on whether you buy a 2- or a 10-line system. According to Surf Computer Services, nonprofit organizations may be eligible for a complimentary copy.

Conclusions

It is, perhaps, as full-featured and flexible as I have seen. Each menu is clear and help is available every step of the way. Oracom is a Sysop's dream—easy to to install, almost self-maintaining, and seemingly limitless in its applications. Certainly, it is more than adequate as a public BBS. But its options make it even more ideal as a commercial, multi-user network. In this form, Oracom can shine.

System used to test Oracom: Leading Edge Model D, 640K memory, 1 floppy drive, 20 megabyte hard drive, Bitcom 300/1200 baud modem, MSDOS 3.2.

For more information contact Surf Computer Services, P.O. Box 3218, North Hollywood, CA 91609; 818-763-2139. ●

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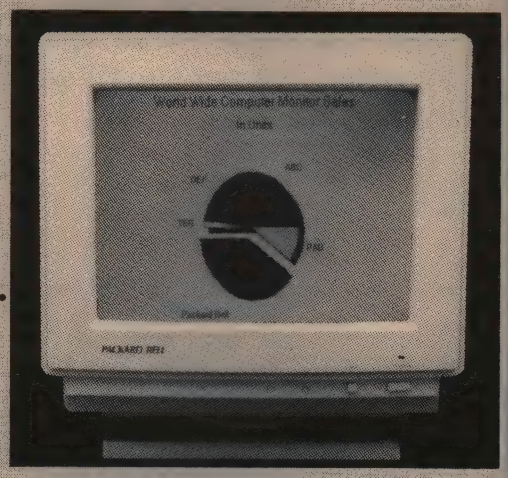

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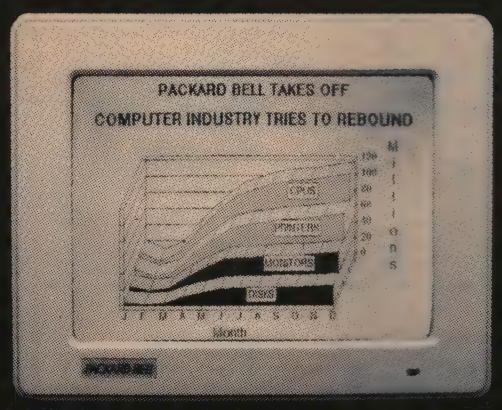

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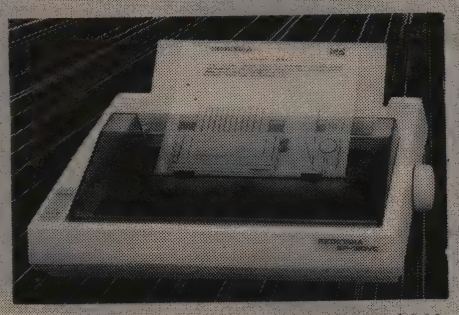

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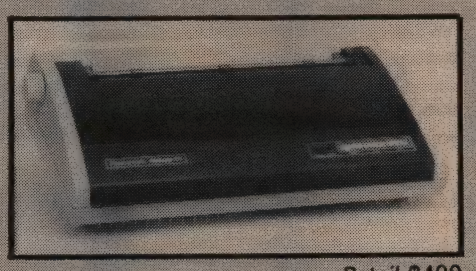

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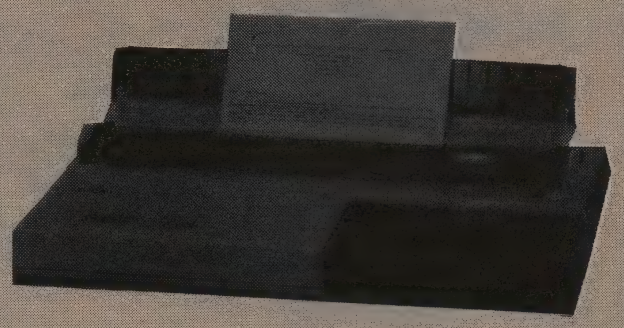

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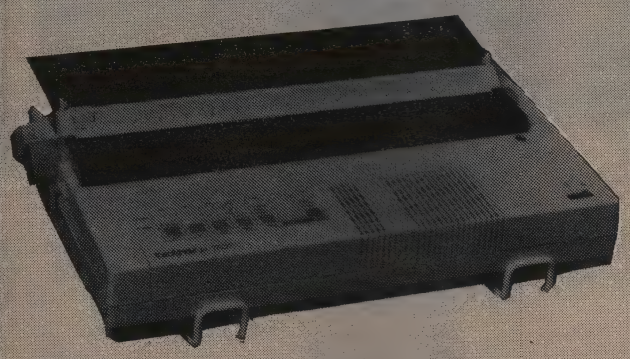

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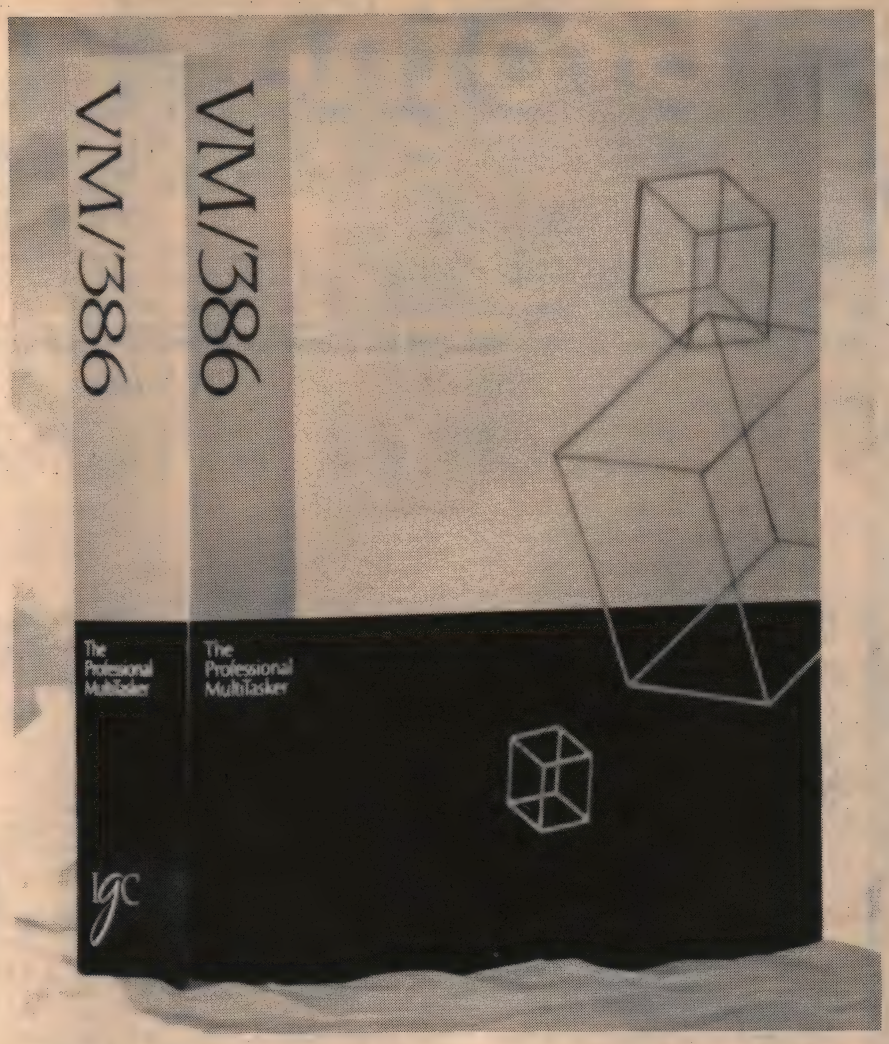

VM/386

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delivers "true multi-tasking," virtual memory management, and a growth path to future hardware/software without forcing users to buy new software or learn the command structures of new interfaces.

VM/386 uses the virtual 8086 mode of the 386 to create a series of "guest" virtual machines. Each virtual machine can have its own DOS, CONFIG.SYS, AUTOEXEC.BAT, memory resident programs like Sidekick or ProKey, and applications. Each virtual machine thinks it has exclusive access to all of the resources of the real computer. Individual virtual machines can be customized to maximize the overall performance of the 386 PC system.

VM/386 is compatible with existing PC/MSDOS software. Users can have multi-tasking without buying new applications software and operating systems. Even "ill-behaved" applications, such as Lotus 1-2-3, run without modification. VM/386 doesn't need PIF files or special loaders. VM/386 is compatible with applications that support the LIM expanded memory specifications, including multi-tasking environments such as Windows 2.0 and TopView. These can be loaded into a VM/386 virtual machine and process or control multiple applications within a virtual machine. Since VM/386 supports a wide range of video adapters (MDA, Hercules, CGA, EGA), it is an ideal host for multiple graphics-based applications like the GEM series from Digital Research, or CAD/CAM applications used by engineers.

VM/386 is not compatible with OS/2 because it is a protected mode operating system. Nor is it compatible with Windows/386 because it is a protected mode operating environment. The same applies to Concurrent DOS 386. VM/386 has to be started in "real" mode in order to load the existing base of operating systems and applications. Once the operating systems and applications are in place, VM/386 sets up the protected and virtual mode capabilities of the 80386 CPU in order to create its virtual machine architecture.

However—what was interesting to discover was that Concurrent DOS-XM can be loaded into a VM/386 window without any conflicts to provide multitasking within a window plus possible multi-user capabilities to host 386. The reason for this compatibility factor is that Concurrent DOS-XM supports the LIM expanded memory specifications. In my initial test run on the Acer 1100, I installed Concurrent DOS-XM in Virtual Machine 1, and MSDOS 3.2 installed in Vitural Machine 2. I then loaded copies of Symantec's Q&A Write to run concurrently under each operating system. Due to an editorial deadline to complete this article, I did not have time to set up the expanded memory features of VM/386 as well as those required by Concurrent DOS-XM so that I could run large multiple applications in Virtual Machine 1. I did run two small applications under DOS-XM without problems in the virtual machine, which bears out the fact that multiple DOS operating systems can reside within the VM/386 virtual machine architecture.

The Product That Wouldn't Die

VM/386 is a classic example of a product concept that almost didn't make it to market. It was originally con-

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VM/386
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ceived by the software engineers at Softguard, a firm that had created a notoriously successful series of copy protection products used by many leading software publishers. When the product was in its developmental stages, in 1986, nearly half of Softguard's engineers and management were assigned to work on it.

Due to the difficulties of adapting a mainframe technology product that thrived in a high-speed environment and accustomed to chomping away at large chunks of memory, VM/386 rapidly drained away most of Softguard's financial reserves. By early 1987, Softguard was at the brink of going under.

Because of numerous technical delays, Softguard's backers were no longer interested in funding the development of this product. However, IGC, a young startup firm with a secure financial base, struck a deal and obtained the rights to VM/386 because they realized the tremendous software design possibilities that the 386 CPU had to offer, especially since the 386 could process applications at 2 MIPS, which is faster than the .4 MIPS of the IBM 370 mainframe. They bailed Softguard out of its difficulties, and also moved the entire software engineering and marketing teams to their California offices.

Solving Installation Problems

VM/386 was designed to operate on all 80386 based computers such as the Compaq Deskpro 386 and those with an Intel Inboard 386/AT. 386 computers that are 100% compatible with these standards can also run VM/386. These include the Kaypro 386, the Acer 1100, the Wyse 386, the Tandy 4000, PC's Limited 386-16, the Orchid Jet 386 board, and others. Although the installation process is almost automatic, and accessing VM/386's features is accomplished through a series of menus and prompts, I had problems getting it to work on my Kaypro 386. IGC's technical support staff went out of their way to help me isolate those incompatibilities within my system so that VM/386 could be installed. Working with a variety of new products every month has taught me to take installation problems relating to 386 hardware and software in stride, because they usually bring to light certain specific system requirements that aren't always covered in the documentation.

The first problem I ran into was that MSDOS could not read the high-density VM/386 system disk, even though I had been using high-density disks in my Kaypro 386 for many months. IGC pinned that down to the fact that the first production run disks of VM/386 were formatted under DOS 3.3. As a result, the format program isn't always downward compatible with all versions of DOS 3.2 being shipped with most 386 computers. This is particularly true of 3.2 DOS versions dated January 1987 and earlier, which contain a number of bugs. IGC obtained a later DOS 3.2 version (June 1987) from Kaypro for me.

The new disk seemed to work fine. I loaded VM/386, cut my virtual windows, but the screen display went haywire when I tried to access a virtual machine window. More consultation. It seems that a 386 computer's hard disk must be formatted and partitioned by the DOS FORMAT and FDISK utilities. My Kaypro's hard disk was prepared by Storage Dimensions' SpeedStor program. This utility apparently plays havoc with a number of advanced software applications. Since I had a lot of data files and special system configuration features set up under Concurrent DOS 386, it wasn't practical to wipe out the Kaypro's hard disk at that particular point in time. I had an Acer Technology 1100/386 scheduled to arrive soon, so I decided to put VM/386 aside until I had the new computer up and running.

Fortunately, the Acer 1100's hard disk preparation utilities were pure DOS, and I was able to install VM/386 and have several virtual machines operating in about six minutes. A few days later, after transferring my Concurrent DOS 386 system configuration utilities to the Acer, I reworked the Kaypro's hard disk drive so that it had a DOS format and VM/386 installed without further conflicts. IGC informed me that future VM/386 production run disks would have a DOS 3.2 high-density format to eliminate this problem.

In addition to the foregoing requirements, a README file on the distribution disk cautions about using any programs which directly modify File Allocation Table (FAT) or directory information. This includes, in addition to special hard disk formatting programs such as SpeedStor, using the DOS CHKDSK command with the /F option, and Norton Utilities-type programs which modify the hard disk directly. VM/386 does not support hard disk partitions larger than 32MB. If you try to use it on a hard disk with a larger partition, VM/386 may fail to read and write correctly, but it will not damage any data already existing on the disk. A new version of VM/386 supporting the Compaq DOS 3.31 implementation, which provides support for hard disk partitions larger than 32MB is expected to be available at the time this article appears.

Bear these facts in mind if you're planning to install VM/386 in a computer that is already up and running. As long as your system meets the basic requirements of having a DOS format on your hard disk and a late version of DOS 3.2, you should not encounter the kind of difficulties I had.

Installing VM/386

VM/386 isn't copy protected. IGC recommends that you make a backup copy with the DISKCOPY A: A: procedure, and use that disk for the installation, because the VMINST file on the disk requires updating. You must begin the installation by rebooting your computer with a copy of the VM/386 distribution disk in drive A. The VM/386 disk temporarily takes control of the computer by extracting BIOS and hardware information which it writes into the VMINST file. Leaving the drive

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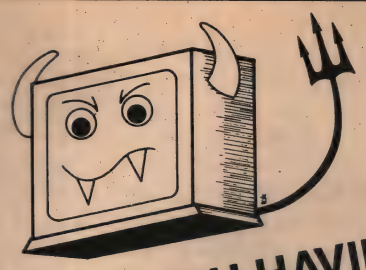

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VM/386
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A door open, you reboot the computer from drive C, log onto drive A, and type SETUP. From that point on you follow the prompts.

If you alter the hardware configuration of your computer in the future by adding or deleting drives, memory, I/O ports, etc., you'll have to update the VMINST file by instructing the computer to boot from drive A with the VM/386 distribution disk installed. Then, you merely copy the updated VMINST file to the VM/386 subdirectory on your hard disk.

Before installing VM/386, check the root directory of your hard drive and rename all AUTOEXEC.BAT and CONFIG.SYS files to AUTOEXEC.TMP and CONFIG.TMP. Conflicts will arise if an AUTOEXEC or CONFIG file contains setup information invoking special expanded memory drivers. During the installation process VM/386 creates AUTOEXEC.VM and CONFIG.VM files which perform several functions when VM/386 is loaded into the machine. They save off the original DOS that was active at the time; then they load the system modules and hardware device drivers into high memory. VM/386 now creates the first virtual machine, into which goes the original DOS that was saved off (now called Master DOS), the VM Manager which is the VM/386 user interface (the menu screens), and the VM Switcher.

The VM Manager virtual machine is like any other virtual machine that runs in the system, except that it has a very high priority and cannot be changed, terminated, or rebooted. The VM Manager communicates with the VM/386 system modules on behalf of the user. An important module inside the VM Manager is the File Share Subsystem, called FSS. In conjunction with Master DOS, FSS performs all the I/O to the hard disk drive and maintains the integrity of the file structure. By doing so, it allows several virtual machines to write to the hard disk at the same time without getting in each others' way.

Another major component group of VM/386 are the Hardware Device Drivers. These modules talk to the physical devices like the keyboard, the printer, the video monitor, the hard disk, and the COM ports. Without them, there would be complete chaos if each virtual machine talked directly to the hardware itself. Instead, the hardware device drivers perform this task for the system and then pass the data and I/O status back to the virtual machine at the appropriate time. This ensures that the data from one virtual machine will not be confused with the data from another.

Each virtual machine thinks that it is talking directly with the hardware, when in reality, it is talking to a device driver module. There is one device driver module for each type of hardware device, and each device driver attempts to simulate the function of the device it represents.

Shared & Exclusive Devices

Certain hardware devices within your 386 computer are allocated as shared or "floating" devices. A floating device is available to any virtual machine that is currently processing a foreground application. The standard floating devices are the monitor, the keyboard, the hard disk drive, and a serial (COM) mouse or other pointing device. These are automatically "linked" as floating devices within VM/386.

Some hardware must be allocated as "exclusive" devices to certain virtual machines in order to avoid possible collision with other virtual machines. Exclusive devices are floppy drives, printers, COM ports connected to a modem, secondary display monitors, backup tape systems, and bus controlled mice.

Since virtual machines can be set up to run in the foreground as well as perform background operations, it is necessary to designate exclusive hardware devices for their use. For example, if Virtual Machine 1 is communicating through a modem to a mainframe or an on-line database, another virtual machine could corrupt the data transmission if it accidentally tried to access the port. The same logic applies to the printing of documents. If a second virtual machine passes a print command to the queue, it would overwrite the data of the first virtual machine. Before an exclusive device can be used by another virtual machine, control has to be released by the machine it had been assigned to, and the user must reassign it through the configuration menus.

Changing Options "On The Fly"

VM/386 has the unique ability to dynamically alter the default values of any virtual machine without requiring that the application in residence be terminated. For example, if you suddenly find that you need to allocate some expanded memory to a virtual machine, using the "hot key" switcher you enter the VM Manager's VM Control Menu and update the expanded memory allocation or other parameters. All updated values will be in effect as soon as you return to your virtual machine window.

Memory Hungry

When the VM Manager is installed it is designated as VMO. It also takes control of 640 Kbytes of system RAM which is used to host the Master DOS, the hardware device drivers, the mechanism to control other virtual machines, and the system's I/O functions.

The pre-set base memory partitions available for virtual machines are 128 Kbytes, 512 Kbytes and 640 Kbytes. In addition, the VM Manager also allocates approximately 36 Kbytes for system overhead to manage the new virtual machine. An EGA VM will require an additional 36 Kbytes. A CGA VM will require 32 Kbytes, and a MDA VM will require 16 Kbytes.

Based on current hardware limitations and the software restraints of the LIM expanded memory specification, VM/386 will manage up to 16 virtual machines inside a 16 Mbyte address space. To use VM/386 for serious applications you'll need at least 3 Mbytes of RAM. This will allow you to cut four 512K virtual machines.

The task of maintaining efficient control over the time-slice allocated to each virtual machine falls on the System Resource Manager. Although users can specify a time-slice interval for each virtual machine, it is usually advisable to let the SRM do the job dynamically, which it does based on an analysis of how various applications are running in the background and foreground. Virtual machines that are switched out and aren't processing background operations, such as compiling a database or communicating with other systems, are suspended so that they steal little if any processor time. This allocates a greater portion of processor time to the foreground machine, which will benefit if it is working on a graphics-based application. According to data supplied by IGC, two virtual machines operating on a 16MHz 386 computer provide an 8MHz performance factor. Four to six applications provide a performance factor of about 4.77MHz.

When VM/386 is installed it takes "total" control of the computer. You will find it impossible to perform a warm boot using CTRL-ALT-DEL. You must return to the VM Manager to reboot a virtual machine. When you reboot a virtual machine no other virtual machine is affected by the process, even though the hard drive kicks into high gear and goes through all the gyrations of rebooting the entire system.

The VM Manager also contains two provisions to remove a virtual machine of one size and create one of another size in the same dynamic fashion as altering virtual machine parameters. Exiting from VM/386 can be accomplished by choosing that option from the Main Menu, or by using the reset switch on your computer. The Kaypro 386 doesn't have such a provision, but the Acer 1100 has a membrane reset switch on the front panel. This avoids having to turn the computer off and on again if a keyboard lock-up does occur as a result of a power spike or a poorly running application.

Moving from one virtual machine to another is accomplished by a "hot" key. The VM/386 hot key is the SYS or SysRq keys. Some AT-style keyboards combine the SysRq key with the Print Screen key. These keyboards require that you use the ALT and SysRq keys together to effect the switcher. When the hot key(s) is pressed the system switches from the current virtual machine to the VM Manager's VM List menu. Using the cursor key you can select to move to another virtual machine, or you can press the ESC key to bring up the VM/386 Main Menu from where you can access all the system's resources.

Although most AT-style keyboards are interchangeable between systems, they don't always issue the scan codes in quite the same manner. The keyboard for the Acer 1100 falls into the odd group. When you try to access the switcher by hitting the ALT-SysRq keys you don't always bring up the VM Man-

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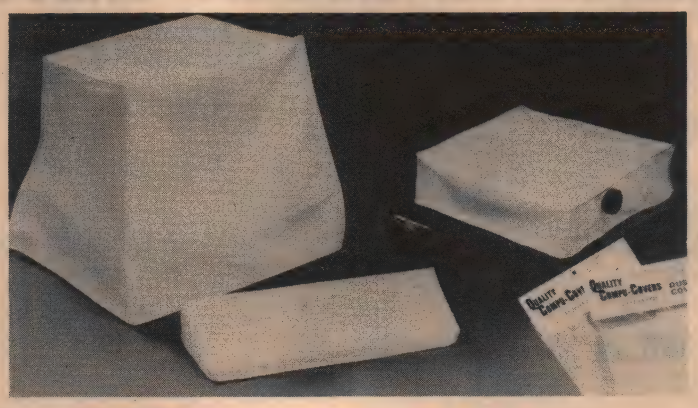

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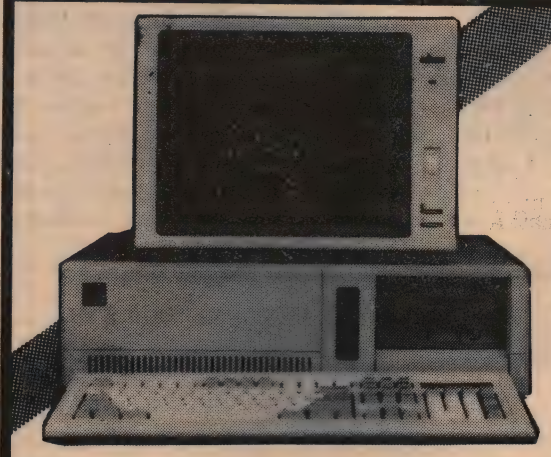

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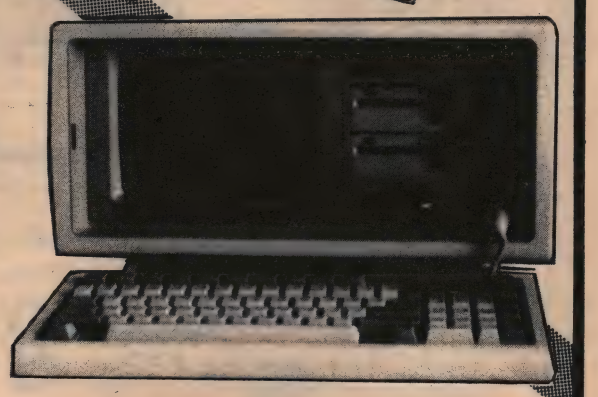

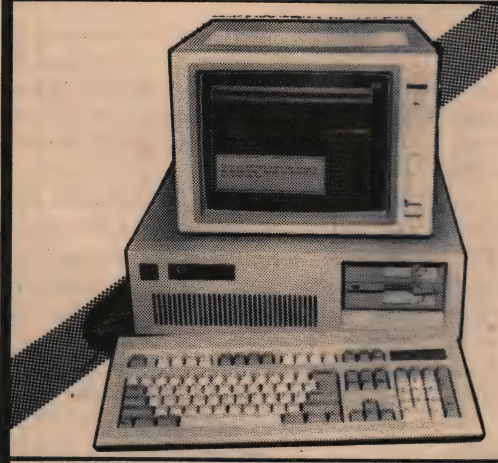

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by Hal Nieburg

What is the best place to hide a bomb? In the toolkit of the bombsquad, of course! Then the unsuspecting computer user, turning to what he thinks is protective software, becomes instead the unwitting agent of his own destruction!

This is the problem. The bombers may be mad, but they're not dumb. In their tormented minds, there is special pleasure to be found by generating suspicion of what is most sacred. Planting a worm in COMMAND.COM is like poisoning mother's milk. It is like assassinating a loved leader. Putting a bomb in the toolkit of the bombsquad is therefore logical and inevitable! Let the Fuzz do the dirty work, without knowing it! Such tactics are often the most favored by those who plant bombs, worms, Trojan Horses, or viruses.

Thus, the very tools that promise safety are themselves prime candidates for infection! Therefore one should be especially wary of uploads on public bulletin boards that promise to defeat the bombers!

For example, two programs may be found on many bulletin boards, BOMBSQAD.ARC (6144 bytes) and CHK4BOMB.ARC (11K), both by Andrew Hopkins. These are legitimate programs, and in their original form achieve the purpose intended. But unfortunately, there have been reports that some copies of the package have been contaminated.

CHK4BOMB.EXE reads the program file from disk and attempts to spot dangerous code and suspicious messages. BOMBSQAD.COM is the next line of defense. During runtime of unknown software, it will intercept calls to the BIOS code, halt processing and alert the operator before a write-to-disk, whether the write be a delete, modifica-

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VM/386 continued from page 314

ager screen. It seems that the ALT key has to be depressed first, then the SysRq key; the SysRq key must be released before the ALT is released. By adhering to this format the scan codes will be read properly by the computer.

VM/386 Development Tools

IGC, better known as Intelligent Graphics Corporation, produces a variety of hardware and software products geared toward the CAD/CAM and graphics markets. They are very confident about the future success of VM/386 as a major influence in the world of 80386 computers control programs. Toward this goal they have designed a series of software development tools that will allow application developers to create DOS programs that break the 640 Kbyte barrier. These are:

X-AM (the eXtended Address Mode). This is an 80386 development environment which allows you to write programs larger than 640 Kbytes and then run them in the protected mode of 80386 using DOS 2.X or 3.X. X-AM includes VM/RUN, an 80386 runtime environment, and VM/DEBUG, an 80386 debugger. The "VM" in these product names indicates that they use the same virtual machine architectures that are used in software for large mainframes.

VM/RUN Features. With VM/RUN, a program can be as large as 1 Gigabyte. Users are limited only by the amount of RAM available on their computers. Future releases of VM/RUN may include demand paging capabilities that allow the applications to use more memory than is physically in the computer. VM/RUN uses a "flat" memory model similar to that used by the Motorola 68000 or IBM/370 programs, where the developer sees a single array of up to 1 Gigabyte.

Since no segment registers are used, the 80386 application program can be thought of as a giant .COM file. Incrementing through multi-megabyte data structures simply involves updating the general register. In 80386 protected mode, all seven of the 32 bit general registers may be used for addressing.

VM/RUN uses an existing DOS to service I/O requests that are issued by the 80386 application. VM/RUN gives you access to all of the DOS facilities. VM/RUN uses the conventional INT 21h interface. VM/RUN automatically puts the system in "low mode" to service the DOS request and then returns control to the 32 bit application in "high mode." Popular BIOS calls (such as keyboard and video) are supported. VM/RUN also supports writing directly to video RAM.

VM/RUN allows developers to combine 16 bit and 32 bit routines within the same application. The 32 bit program can load and execute a 16 bit DOS program through the standard DOS INT 21 function 4B interface. Applications can also 4B to COMMAND.COM and thereby allow the users to execute a second DOS program. Developers can specify the amount of RAM reserved for DOS. VM/RUN includes a special internal service to load 16 bit routines and then CALL them as needed from the 32 bit application. The 16 bit routines can also call the 32 bit routines. Developers are offered the capability of writing 32 bit interrupt service routines with 32 bit applications. Existing 16 bit DOS interrupt handlers can be replaced by a developer's own 32 bit interrupt handlers. And, application support for MSDOS virtual disk (VDISK) software means that there is no need to disable VDISK software before running the 32 bit application.

Summing Up

I have to admit that VM/386 is a very revolutionary multi-tasking concept for 80386 based desktop computers, and I was impressed with the way it performed. By combining the power of VM/386 with IGC's X-AM development tools to create DOS compatible programs as mentioned earlier, you indeed have an important product on the horizon.

Whether VM/386, Concurrent DOS, and some other products can sway the tide from the direction Microsoft and IBM are heading, by establishing themselves as viable alternatives, remains to be seen. I hope they do. Not just because it will keep the pot boiling, but because their technology is so much more interesting than OS/2 and immediately usable across the entire base of 386 systems.

The VM/386 manual is well-written and profusely illustrated. Instead of the conventional method of detailing system features and then letting users sift out the order in which they should be used, this manual is logically constructed to lead you from the beginning to the end. This allows you to have VM/386 up and running before you get to page 50. Thereafter, as you need to explore and use the advanced features, you can tackle them one step at a time.

A review of this type can only highlight the important operations. Numerous options that allow users to fine-tune the runtime performance of multitasking applications are available. Since VM/386 will be assuming new dimensions in the months ahead, I will provide an updated report in the near future.

VM/386 is sold through qualified dealers and distributors and has a list price of $245. For additional information, please contact IGC, 4800 Great America Parkway, Santa Clara, CA 95054-1221. (408)986-8373. ●

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data destruction when, for any reason, an open file is abandoned or interrupted during a long file write, or when a disk is accidentally changed. This is a highly specialized function, of importance in the handling, backup, and transfer, for example, of large dBase III files. Priced at $49.95, it is memory resident and prevents the user from swapping diskettes while a file is open.

If a file is not properly closed before the diskette is swapped, DOS will write the directory and File Allocation Table of the first disk report on a bad diskette. This diskette was destroyed by using the name of the offending file on the screen. It will be up to the user to take corrective action.

The company, which is engaged in anti-viral work for student-used micros at Lehigh University, has two other products. DISKJOCKEY is a RAM-resident cataloguing and search utility to support large word processing data collections, automatically updating and cross-indexing the output of networks. Once installed it makes possible instant location, retrieval of all documents and strings anywhere in the system.

Writeguard is a utility that prevents the dBase III "Browse" command, swapping diskettes and then typing "Quit." If Writeguard is installed, a window appears on the screen advising the operator that the wrong diskette is in the drive. The operator can then place the original diskette back in the drive and proceed, and no data is lost!

The regular price for the new package is $79.95. However, for readers of this magazine, a special price is available (send tear-trip of masthead along): Labtest & Monitor, $20; Dr. Panda Utilities, $50; and Dr.Panda Utilities and Writeguard, $75. ●

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Best Solutions
continued from page 316

tion of FAT or any files, or a hard disk reformat (physical or logical). The program queries the user if they wish to continue or to abort, thus preventing any harm to the system.

One caller says, "Well I was sitting there watching CHK4BOMB eating my FAT! I immediately pulled the switch, but it was too late. There was nothing for it but to shed a tear and go to work reformatting and setting up the hard drive...most of it was backed-up!"

A recent *Computer Shopper* article on the topic did contain an explicit warning:

"It is a good idea never to un-ARC or test unknown software on the hard drive. Always, move to a floppy and run from there. Usually, invaders are written to target the default drive and the root directory. Moving to floppy complicates the problem for the insidious enemy and thus provides a margin of greater, but certainly not absolute, protection for the system.

"On a routine basis, always use a PROTECT or Read/Only mode before running an unknown piece of code. As a matter of safety, even such software must be tested with the protect pad in place before being installed on a hard disk for regular use—that is use the protect patch, run the program on itself, and do it all on a floppy at a safe remove from the main drive." And, of course, always keep a set of backup floppies handy and up-to-date.

Does this sound like a job for a James Bond? I have heard from Andy Hopkins on the subject, and he offers another alternative. He has recently introduced a new product, Dr. Panda Utilities, a set of anti-contamination tools that if acquired from him, are guaranteed safe and reliable.

Dr. Panda is the son of Bombsquad. His round, soft and furry exterior is deceiving. Inside is a set of three utilities that contain the heart of a tiger, the unrelenting persistence of an Inspector Hercule Poirot, and the savvy and skill of a James Bond. Published by Panda Systems (801 Wilson Road, Wilmington, DE 19803).

LABTEST.EXE searches every line of code for any suspicious indications and unusual breaks in the series, reporting to the operator attempts to write to reserved sectors of drive; PHYSICAL.EXE sniffs for a virus; and MONITOR.EXE is a memory-resident patch that can be instructed to stop processing until the user is assured that nothing untoward is about to happen.

Physical attempts to diagnose the presence of a "Virus" within the operating system. An installation program places PHYSICAL.EXE on the boot disk or hard drive and must be used with an original copy of DOS. Once the program is installed, it can be run from time to time to check on the integrity of the system files. It is not automatic. It must be specifically run to check on the condition of the system. If all system files are the same as on the original DOS diskette, the message "All System Files Check OK!" appears on the screen. If a file has been corrupted by a virus, Physical will display

Windows DRAW 1.04

Reviewed by Chris Dickman

All graphics applications fall neatly into one of two categories, that of either "paint" or "draw" software. The former is by far the most common and is used to create bitmap graphics, images created and stored in terms of individual pixels. Draw programs, on the other hand, handle graphics as vectors; created images are stored as a series of mathematical definitions. One can describe them as being "object-oriented."

One of the biggest advantages of this approach is that images can be resized without creating the unsightly "jaggies" common to paint programs. Complex images can also be created by combining many graphic elements, like circles and squares; once completed, the composite image can be resized as a single entity.

Although there are many paint programs available for IBM-PC compatible computers, draw software is scarce. Although not without flaws, Windows DRAW from Micrografx is arguably the most capable of the genre. It's a full-featured program that runs under Microsoft Windows and can be used to generate presentations, brochures, proposals, flowcharts, organization charts and similar graphics-intensive material. It also serves as a useful adjunct to desktop publishing software, particularly PageMaker.

For those not already running Microsoft Windows, DRAW is supplied with a runtime version of Windows 1.03. For these users, Windows simply provides the mouse and menu environment that makes the program easy to learn and use. Those of us running other Windows applications, however, will be able to make use of Windows' ability to run several programs at once and move data between them. For example, I often run DRAW and PageMaker at the same time, creating graphics in DRAW and copying them to PageMaker.

Although you can use DRAW without a mouse, the process isn't much fun. Some would call it painful. This has much to do with the menu-intensive nature of the program. Of the eight menus that drive it, the Draw menu is where most of the action takes place. You use this to select one of ten drawing modes or the text mode. Most of the drawing modes let you create the familiar boxes, circles and lines common to all graphics programs. Other menus let you set line type and thickness, text attributes and fill patterns.

The area you can draw on corresponds to a 37x37 inch square, which can be divided up into a number of pages. Sixteen 8x10 inch pages will fit into this area, for example, and the largest permissible page size is 17x17. A number of "views" of your work are available, from one that displays all pages to a zoom view that displays just a tiny fragment of it. These are well chosen but being able to move between views by using just the right mouse button ala PageMaker would have been faster than being forced to always use the menu.

Images (or "symbols" as Micrografx calls them) are created by selecting a mode and simply drawing a shape on the screen. A few circles, lines, arcs and presto—you've duplicated the company logo. These disparate elements can then be permanently linked together and the logo resized, copied, rotated and flipped as desired. And you can always go back and break such images apart into their elements. A number of disks of fairly inane clip art are supplied with DRAW; their prime use is as a source of raw material, which is obtained by breaking apart the images. Somewhat more useful collections of clip art are available from Micrografx at $49.95 a pop.

A number of drawing modes beyond the run of the mill make image creation easier. Arc, ellipse, jointed line, polygon modes and, most useful of all, a freehand drawing mode makes for a fairly broad range of tools. There are some annoyances, however. A rounded box mode provides no choice of corners, compared to PageMaker's generous six. Lines aren't defined in terms of point size, which doesn't help when using DRAW images with desktop publishing software. And for some inexplicable reason, you can't draw lines with the many patterns available for filling shapes. Worst of all, perhaps, is that when drawing freehand all you see on the screen is a thin line, even if you've selected a nice fat thickness. The actual line isn't displayed until you've finished drawing the line. As a final beef, on clicking the mouse at the beginning and the end of a line drawing sequence, quite often the line would be extended a short distance in a random direction. This is no doubt caused by mouse "noise" but it's nonetheless disconcerting.

DRAW's handling of text is also not entirely satisfying. It provides four bitmap and three vector fonts, both of which can be used to create text with a number of attributes such as bold and italic in fifteen sizes from 6 to 72 points. The bitmap fonts are only readable in the Actual Size view, which makes working with them rather unpleasant. Also, unlike the graphics fonts, they can't be stretched, rotated or combined with other elements into a permanent image. The graphics fonts mimic Times Roman, Helvetica and a generic plotter face. As you may have guessed, DRAW does not let you access the many fonts you may have available in a laser printer, which is a real weakness for many applications.

DRAW does has a few tricks up its sleeve that will appeal to certain users. Most interesting is its ability to import a Lotus format graph file and break it up into little chunks that can then be enhanced. This lets you redraw lines, fill bars or pie segments with different patterns, change text, add new graphics and so on.

While DRAW gets the job done, it has a slightly dated feel in operation that often gets in the way of image creation. When moving a graphic element around the screen, most programs let you see what you're moving. Not DRAW. What's displayed is a box indicating the graphic's outline, which is not conducive to accurately aligning elements on the screen. In the same vein, moving an object to a part of the page beyond the current screen boundary is cumbersome. Instead of the screen scrolling with you when you reach its edge (again, like PageMaker), you have to manually scroll the screen then go back and continue dragging the object. There are a number of instances like these scattered throughout DRAW that make it less pleasurable to use than it should be. Micrografx, take a close look at PageMaker!

A number of the program's shortcomings should be addressed with the release of DRAW Plus, due for release in the first quarter of 1988. Not only will it run under the more current Windows 2.0 and use the fonts of printers like the Apple LaserWriter but it will load scanned images that can serve as a template for the construction of a new image, similar to the approach adopted by Adobe Illustrator.

I can only hope attention has been given to the many small points that currently detract from the program's ease of use. If so, the program could be recommended without hesitation. As it is, however, Windows DRAW may well be the best of its kind currently available but that doesn't mean there isn't room for improvement.

For more information, contact Windows DRAW 1.04, Micrografx, Inc., 1820 N. Greenville Ave., Richardson, TX 75081; (214) 234-1769.

Draw program for the IBM-PC and compatibles. Suggested retail $299.00. ●

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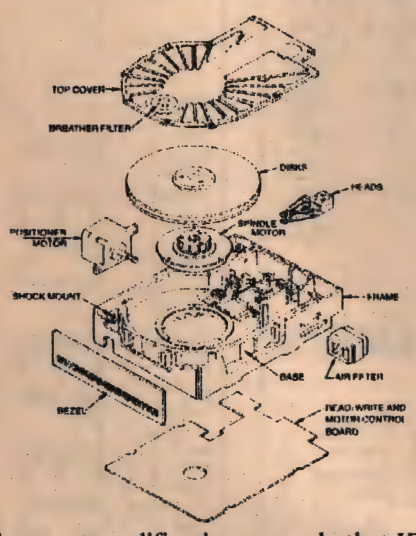

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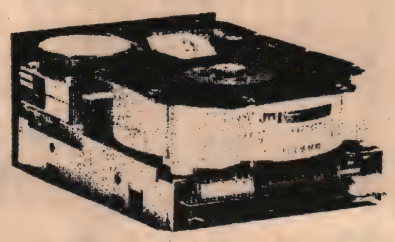

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QuickWindows

Reviewed by Charles Olsen

BASIC is starting to gain acceptance as a serious applications programming language, probably due in a large part to Microsoft QuickBASIC. BASIC programs are relatively easy to write and, when compiled, run at an acceptable speed. And a programming environment such as QuickBASIC (especially QuickBASIC 4.0) can really speed up the process of program development.

Unfortunately, the BASIC language does not support windowing, and windows are becoming fashionable among commercial software. In addition to being fashionable, they look really slick, and can improve a program's "look and feel."

QuickWindows, from Software Interphase, provides windowing capability in BASIC. QuickWindows is a library of routines written in assembly that can be linked in with your QuickBASIC programs. By simply CALLing the routines, your programs can have windows, dialog boxes, input buttons, horizontal and vertical menus, help menus, screen and mouse functions, and more.

The QuickWindows library (QW) has 66 functions. The window functions include routines to open and close windows, draw boxes, define input buttons on the screen, clear a window or a portion of a window, set foreground and background colors, make the cursor visible or invisible, delete rows, get the relative position of a mouse within a window, output strings, reverse attributes of a full or partial window, set cursor shape, scroll a window vertically, and turn word wrap within a window on or off.

The menu functions include: Display help information. Define menu bars and turn them on or off. Make selections from menus. Enable or disable menu options, and display pop-up menus (horizontal or vertical). Screen functions include: Set screen attributes, define box styles, store a portion of the screen into an array, restore screen from array, reverse foregound or background attributes, or scroll a portion of the screen vertically.

Finally, there are mouse functions, including: initialize the mouse, turn on the mouse cursor, get button pressed/released status, get mouse position and button status, turn light pen emulation mode on or off, set mouse cursor position, and set minimum and maximum X and Y coordinates.

With QuickWindows, up to 32 windows may be active or open at one time. If the windows are not overlapped, they can be closed in any order. (If windows overlap, they must be closed in reverse order.) Window size cannot exceed 24 lines or 80 columns.

A menu bar programmed in QW can have up to 10 menus, and each menu can have 16 options. In a pull-down menu system, each menu can have up to 300 characters of text. You can have up to 255 items in horizontal or vertical pop-up menus.

The QuickWindows routines can run on a black and white (monochrome graphics) monitor, but function best when a color monitor is used. The sample programs included with the software assume that all colors are available. If the sample programs are run without modification on a black and white monitor, they are somewhat disappointing.

The QW routines add about 24K to your object code. During program development, you will need 320K of available memory to load QuickBASIC and the QW library. The documentation recommends that you have at least 512K of RAM, but as cheap as memory is, there's no reason to have less than 640K.

The documentation consists of a 127 page manual that is bound in such a fashion so that it stays open at any page you turn to. It has a Table of Contents that lists QuickWindows functions with brief descriptions, along with the page numbers where the commands are described in detail.

continued on page 320

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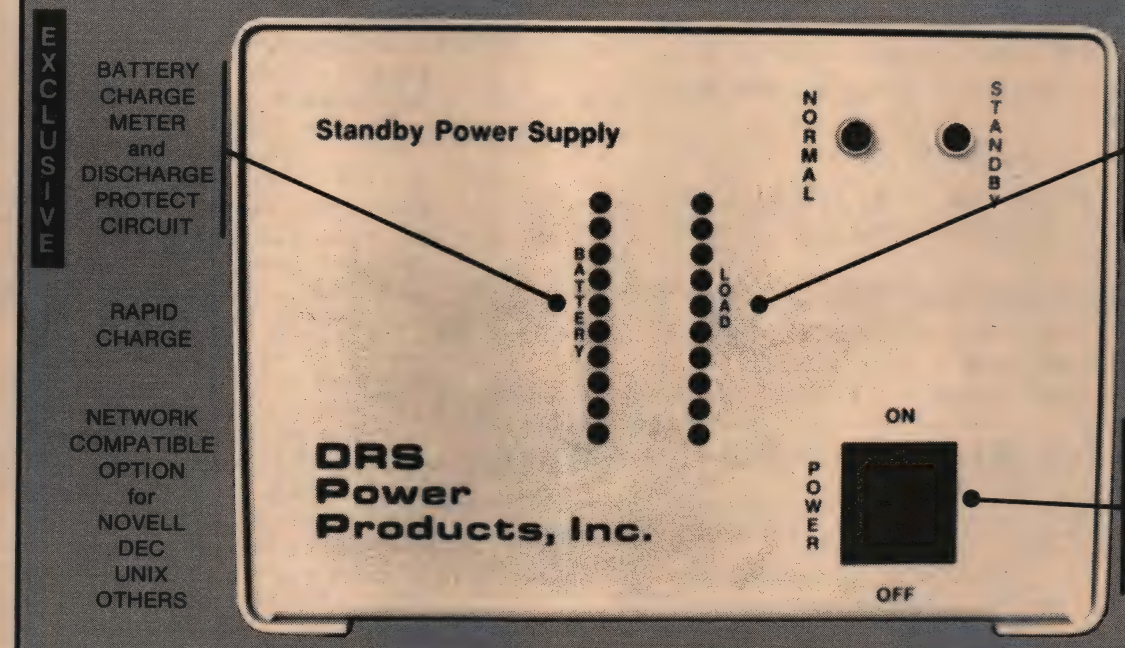

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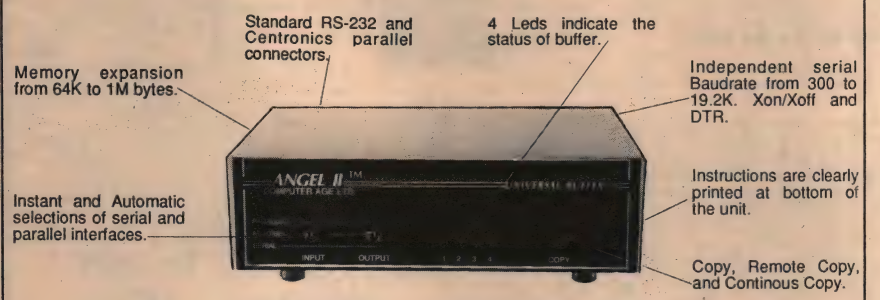
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QuickWindows
continued from page 319

The manual gives very few examples of how to use the QuickWindows subroutines, but the software is shipped with source code for several QuickBASIC programs that use the various routines. These programs should be compiled by the user, then run and studied to give a better understanding of how the QuickWindows routines function.

Apart from a lack of examples, the manual gives all of the information that you will need to make use of QuickWindows. Besides discussing the QW functions and parameters, it also tells exactly what commands to use when starting QuickBASIC with the QW library, and when compiling stand-alone programs from the DOS command line. Experienced QuickBASIC users won't need these instructions, but newcomers will appreciate them.

The biggest part of learning QuickWindows lies in mastering QuickBASIC. If you know QuickBASIC, using QuickWindows is simply a matter of CALLing subroutines that will be linked in with your program.

There are a lot of QW subroutines, and some of the subroutines have a list of parameters as long as your arm. You'll need to keep the manual handy when you're adding QW calls to your program to make sure you get all of the parameters, and in the correct order.

Many of the QuickWindows commands use the same parameters. In these cases, the parameters are always given in the same sequence, which will make it a little easier to learn how to use the QW routines.

If you keep the manual nearby, QuickWindows is fairly easy to use. The only aspect I found annoying pertains to screen attributes and keyboard scan codes, which are used in many of the QuickWindows subroutine calls. Since subroutine calls often include a long list of parameters, you will need to check a command in the manual as you enter it in your program. But when you get to the screen attribute and keyboard scan codes, you must turn to Appendices 1 and 2, then turn back to the description of the subroutine to continue entering parameters. A quick reference card that lists attribute and scan codes could eliminate a lot of page turning. (Of course, the user could photocopy these pages to make his own quick reference card.)

To give you an example, the QW command to open a new window looks like this:

```
CALL WOPEN
(x1%,y1%,x2%,y2%,style%,color%,title$,
VARPTR(array%(start%)),id%).
```

That's one of the longer commands, and that list of parameters gives you complete control over every aspect of the window: top left and bottom right corners, box style (no border, single line border, double line border, light shadow border, medium shadow border, dark shadow border, solid border, double line border with square corners, or user definable border), foreground and background colors, window title, the array to store the screen information below the window, starting element of the array, and window identifier that is to be used when giving other commands to this window.

Other commands are much shorter. To reverse the attributes of an entire window, the command is CALL WREV(id%,mode%). Here, id% is the identifier of the window to be reversed, and mode% is used to indicate if only the window attributes should be reversed, or if the window and border attributes will be reversed.

The manual states that technical support is available in three varieties, but only two of these are actually obtainable. According to the documentation, the preferred method is through the Syslink bulletin board system. To gain access to the BBS, you must first write to Software Interphase and request a Syslink ID number. An ID number will be sent to you "within one work week."

However, when I wrote and asked for an ID number, I got a call informing me that the BBS was not active. Apparently, no other users have expressed an interest in using this type of tech support. I was a little disappointed, because I really like the BBS approach to tech support. But in this, I seemed to be in the minority among QuickWindows users.

I was informed that the most commonly used method of technical support among QW users is to call the company between 1:00pm and 5:00pm, Monday through Friday. The call is not toll-free, but there is no charge for the tech support.

If you can wait a few more days for an answer, you can write to Software Interphase. You can put the letter on disk as an ASCII file and include your source code, so that they can see exactly what's happening.

The "look and feel" of a program plays a large part in determining if the software is user friendly. Programs that are not user friendly are less likely to be purchased or used, so programmers need to put a great deal of effort into designing a user interface that is simple, easy to use, and attractive.

With QuickWindows, the hardest part of this has already been done for you. These routines can help you program a slick, attractive user interface that is easy to use. At $59 ($79 if you also get the assembly source code), the price is certainly reasonable.

If you are programming in Microsoft QuickBASIC, you should give serious thought to using QuickWindows.

QuickWindows, Software Interphase Incorporated, 5 Bradley Street, Providence, RI 02908-2304, (401)274-5465. Requires: IBM PC or compatible, DOS 2.0 or later, Microsoft QuickBASIC, or BASCOM, CGA or MGA video adapter, two disk drives or hard disk, 320K RAM (512K recommended). List price: $59 ($79 with assembly source code). Not copy protected. ●

Advertise in COMPUTER SHOPPER

New GEM Desktop Publisher Release 1.1

Digital Research Inc. recently announced increased functionality and aggressive new pricing for its popular page composition application, GEM Desktop Publisher release 1.1.

"We are responding directly to our customers' requests for more fonts, enhanced device support and better display performance for GEM Desktop Publisher with the shipment of release 1.1," said Dick Williams, Chief Executive Officer of Digital Research.

GEM Desktop Publisher release 1.1 is now available at a suggested retail price of $299, a 25% reduction from its previous list price of $395.

GEM Desktop Publisher includes as standard in the package GEM/3, the latest release of GEM system software for high performance; Bitstream, Inc.'s Fontware Installation Kit, providing access to more typefaces in multiple sizes; and the Fontmerge Utility program for creating customized font sizes.

Performance Enhanced

With the addition of GEM/3, users of GEM Desktop Publisher release 1.1 will experience much faster text and graphics re-draw on the screen for CGA and VGA type monitors. The new release also offers faster output for PostScript devices.

More Fonts Supported

GEM Desktop Publisher release 1.1 offers enhanced font capability providing the user with the ability to access more fonts in more sizes, including resident printer fonts. In addition, the Fontware Installation Kit included with GEM Desktop Publisher release 1.1 provides 9 typefaces: Swiss (Helvetica equivalent), Swiss Bold, Swiss Italic, Swiss Bold Italic, Dutch (Times Roman), Dutch Bold, Dutch Italic, Dutch Bold Italic, and Charter, a digital-style typeface designed by Bitstream.

Other typefaces for use with GEM Desktop Publisher such as Futura, Cooper Black, Courier, Broadway, Prestige and over 100 others are available directly from Bitstream and Fontware dealers.

Fontmerge Utility for Customized Point Sizes

Another feature added to GEM Desktop Publisher release 1.1 is the Fontmerge utility program. This is used for creating font width tables. The user can select typefaces and typeface sizes for PostScript, Hewlett-Packard Soft Fonts and generic printer fonts.

Multiple width tables are supported for use with single or multiple output devices. Each width table gives the user access of up to 512 individual font sizes of the typestyles offered with GEM Desktop Publisher release 1.1 and, in addition, supports underlining of each typeface style.

Improved WYSIWYG Control

GEM Desktop Publisher users can now generate multiple point sizes in each typeface supplied for every device supported by GEM. Full WYSIWYG (What-You-See-Is-What-You-Get) representation is provided on-screen since matching screen and printer typefaces can be created. As a result, users will experience more control over the final appearance of their documents.

More Fonts Supported On PostScript Printers

GEM Desktop Publisher provides full access to the internal fonts available with the Apple LaserWriter and Apple LaserWriter Plus and other PostScript-compatible laser printers without requiring the purchase of additional matching screen and printer fonts. Width tables are included in GEM Desktop Publisher to allow access to Helvetica, Times Roman, Courier and Symbol typefaces on the Apple LaserWriter and additionally, Avant-Garde, Palatino, Century Schoolbook, ITC Bookman, ITC Zapf Chancery, ITC Zapf Dingbat and other typefaces on the Apple LaserWriter Plus.

Downloadable PostScript fonts from third-party vendors such as Adobe are also fully supported and can be generated using the Fontware Installation Kit.

Hewlett-Packard Soft Font Support

For exceptionally high-quality output and fast print speed on Hewlett-Packard laser printers, GEM Desktop Publisher provides full support of the Hewlett-Packard Soft Font typeface library of portrait fonts without the use of matching screen fonts. These can be generated for the Hewlett-Packard LaserJet and LaserJet Plus II laser printers. 300 dots-per-inch (dpi) fonts are also supplied with GEM Desktop Publisher for printing landscape-oriented documents and for use on printers where Soft Fonts are not supported due to lack of memory.

Upgrade For Registered Users

All registered users of GEM Desktop Publisher who registered the product prior to March 31, 1988 will receive a notice to upgrade to release 1.1 at no cost.

Page Composition For The Mid-range Market

GEM Desktop Publisher, originally launched in April 1987, was the first desktop publishing package available for the mid-range personal publishing market. Users of GEM Desktop Publisher in this market segment typically include business professionals found in areas such as marketing, legal, sales, or accounting who use a personal computer on a daily basis and have a need for document enhancement.

For more information contact Digital Research, Box DRI, Monterey, CA 93942; 408-649-3896. ●

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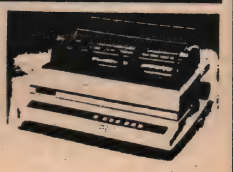

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Laser Cartridge For Spreadsheets

by Ronny Richardson

The Problem

Laser printers have changed the way word processors operate. No longer is a dot matrix printer acceptable for correspondence and reports, now it has to be laser printer quality. Many of us would scrap our dot matrix printers altogether, except for spreadsheets. Despite the improvements in laser printers, they are not good enough for spreadsheets.

The smallest cartridge lineprinter (non-proportional) font HP offers is 16.66 characters per inch [CPI]. That means that printing in landscape mode with tiny margins yields a maximum of about 170 characters per line. That has forced many laser printer owners to keep their dot matrix printers so they could print in compressed print on wide computer paper.

Most of us wanted to get rid of the wide paper and noisy printer, but till now there was no way.

JetWare has introduced a font cartridge especially for printing spreadsheets. It has portrait and landscape fonts in 12, 16, 21, and 30 CPI. That means you can print 240-characters (the maximum allowed by Lotus) in portrait mode with tiny margins. In landscape mode you can get almost as wide of text (221 characters) with the next larger 21 cpi font. Figure 1 shows the maximum amount of characters available with HP cartridges and the JetWare cartridge. As you can see, the JetWare packs twice as much information per line.

All this would be worthless if the type was hard to read. That is not the case. Figure 2 shows both cartridges in 16.66 cpi mode. As you can see, the JetWare cartridge is much easier to read. You can even read the tiny 30 cpi print, although I would not want to do that all day.

At $325, the JetWare 123 cartridge is not cheap. But when you consider it lets you scrape your noisy dot matrix printer and wide paper, it is worth every penny. The JetWare 123 cartridge is one of the best enhancements to 123 I have ever seen. It is highly recommended.

For more information, contact Computer Peripherals, Incorporated, 2635 Lavery Court, Suite 5, Newbury Park, California 91320, (805)499-5751. ●

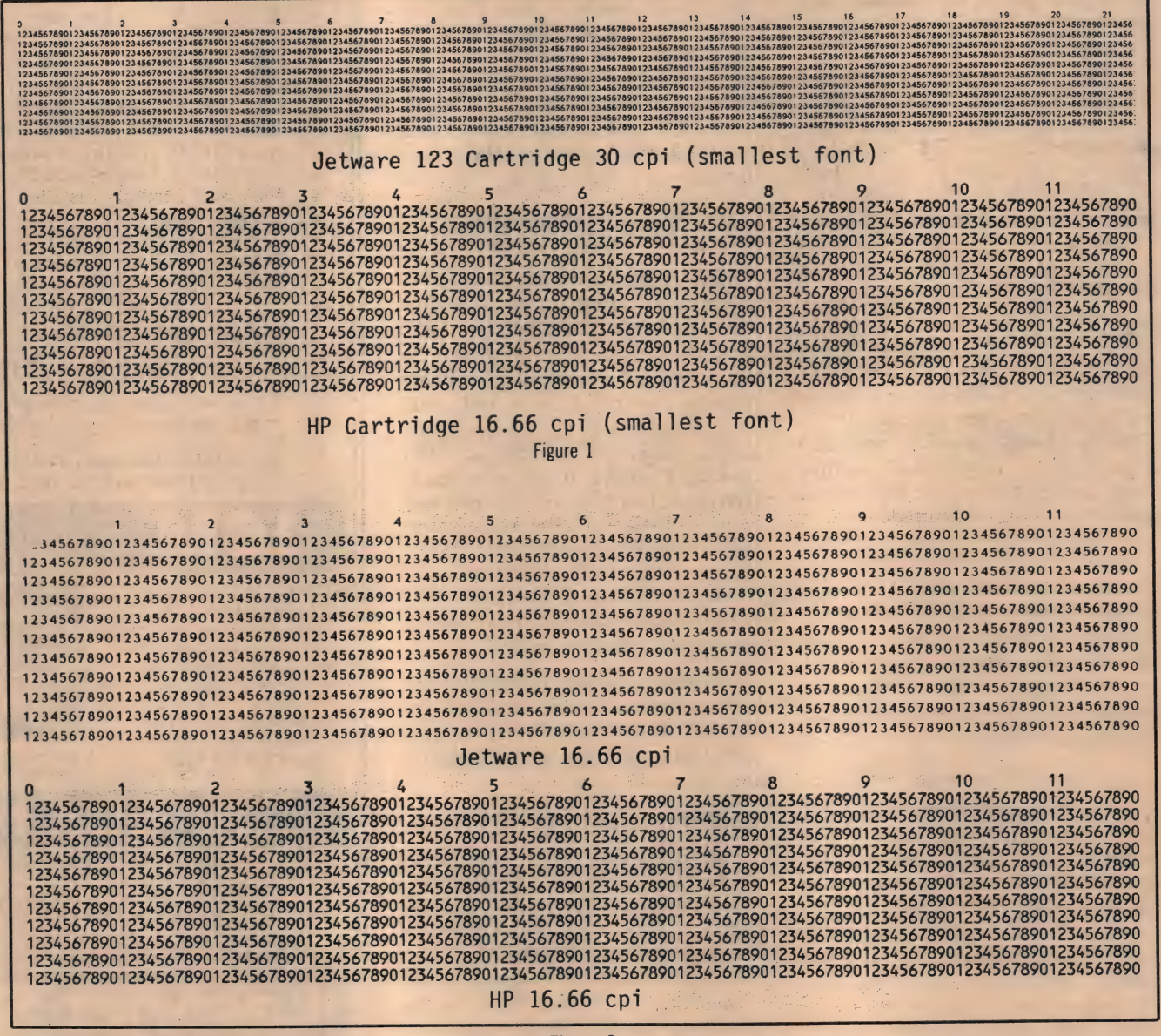

Figure 1

Figure 2

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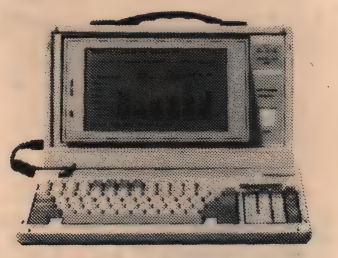

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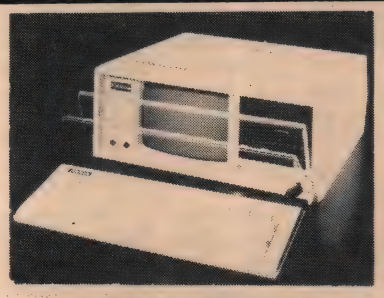

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Surplus IBM Printer Makes Laptop Traveling Companion

by Ed Quillen

If you've traveled with one of Tandy's low-end laptop computers—the Model 100 or the Model 102—you've certainly come to appreciate the little machines.

There isn't much you can do about the screen without spending some major money. But if you could just get a printout of your file, you could edit your work the old-fashioned way, and then go back into "TEXT" to make your changes official.

That's just one reason you might want a printer that's as portable, and as reasonably priced, as your Tandy laptop. If you shop judiciously, you'll be able to travel with a cheap, light printer after an investment of less than $50 and perhaps an hour's work.

Remember the IBM PCJr? Big Blue would likely prefer to forget about that machine. But in its glory days, IBM contracted with Canon to manufacture thousands of small printers for the PCJr. Officially, they were known as the "IBM Compact Printer."

Those printers listed for $199.95 then. They are now available through mail order for less than $50. (The best deal I've seen is $29.95, plus $4 shipping and handling. (See ads from Midwest Micro & B.G. Micro in *Computer Shopper*.)

The Compact printer is light, about five pounds. It's small—about a foot wide, nine inches deep, and less than four inches high.

It isn't perfect. It's slow, only 50 characters per second. It uses thermal paper, so the print quality isn't what you'd use for your resume if you're serious about finding a job. It requires 120 volts, which is fine for motel rooms but impractical in airport lobbies. It's a serial printer, and the Tandy 100 and 102 function more comfortably with parallel printers.

But the size and price are ideal if you just need something for running off drafts when you're on the road. So if that's what you need, order one of these printers.

When it arrives, your next stop is the local electronic parts store. I'll assume it's Radio Shack, since just about every town has one. What you'll need there is a DB-25P connector (Part No. 276-1547, $1.99), a hood for the connector (Part No. 276-1549, $1.99), and some 8.5 inch wide thermal paper, which comes in 100 foot rolls. If you're lucky, you can buy just a roll at a time. Otherwise, you'll end up with the six-roll box (Part No. 76-1003, $24.95).

Once you've returned, put some thermal paper in the printer, as per the manual that comes with it, and make sure it's working properly. Like most printers, it will run a self-test if you turn it off, then hold down the "Paper feed" button as you turn it back on.

Now get your soldering iron, wire-cutters, and the like. You'll need to make the printer's cable mate with the serial port on the back of the Tandy.

One end of the cable is tied rather permanently to the printer. The other end has an offbeat connector for the PCJr. Just snip that connector off. Get the cable open. You'll find a shield, which also has a bare wire, and four insulated wires—two black, one red, and one white.

Take your DB-25P and solder a short jumper wire between pins 6 and 20.

After that, connect the printer cable's shield wire (frame ground) to pin 1. The white wire (CTS) goes to pin 5. Red (TXD) to pin 2. Both black wires are signal grounds, and go to pin 7.

Don't put the hood over your DB-25 yet. The socket on the rear of the Tandy sits in a narrow slot. There isn't enough room for the two long lips on the front of the hood. Remove those lips with a hacksaw or sharp knife.

Once the lips are gone, you can put the hood around the DB-25P connector.

That takes care of the hardware.

continued on page 324

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Kimtron's MOS/30 Multi-User PC Solution

by Peter Ruber

The arrival of Intel's 80386 32-bit microprocessor, with its Virtual Address Mode, its Protected Mode, and its Memory Management Unit, has sparked the development of a new generation of computer control programs. These control programs demonstrate interesting and innovative ways of providing multi-tasking and multi-user solutions for the power user.

This is the second article in an informal series exploring some of these new programs and their associated hardware.

Retrofitting PC's and AT's

Although Kimtron's MOS/3X was designed to work with PC and AT computers, I have included it as part of this series because an 80386 version is in development. It is expected to be available on or around the time this article appears.

While some terminal manufacturers like Wyse and Televideo have expanded their operations to include computers, Kimtron has stuck to the field it knows best—making terminals and related products. Their related products include a variety of multi-user solutions through Local Area Networks, diskless color workstations, and proprietary operating environments.

MOS30 was designed as a multi-user retrofit for PC/XT and AT computer systems. It enables small business users to add workstations without incurring major capital expenditures, and large businesses a way of creating departmental clusters for training purposes using hardware that might otherwise wind up on the dust heap.

There are two basic component

continued on page 325

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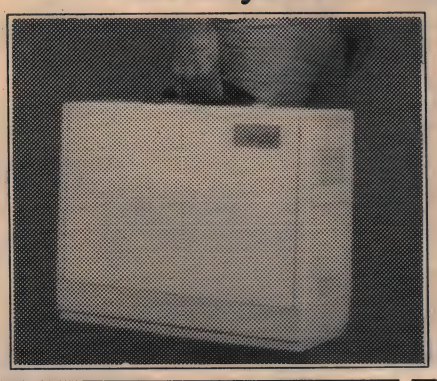

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Surplus IBM Printer

continued from page 323

Here's why you need to work on the software.

A printer generally needs to be told two things to start a new line. It must be told to move the printhead to the left of the page. That's the "carriage return," whose ASCII value if 13.

The printer also has to be told to advance the paper one line—a linefeed, ASCII value 10.

One peculiarity of older Tandy machines is that they sent only a carriage return at the end of a line. Tandy printers knew enough to throw in a linefeed every time they received a carriage return.

Most printers produced by other companies could adapt to this. You can set a DIP switch, and the printer will add linefeeds.

Junior's little printer, however, doesn't have DIP switches. It supposedly has a control sequence that will make it add linefeeds—ESC 5 (0), according to the manual. The printer's manual is clear elsewhere, but this isn't. Various combinations of CHR$(27) + CHR$(53)—by itself, with "0," with "(0)," with CHR$(0)—none of them worked.

Fortunately, it is easy to persuade your Tandy laptop to send a linefeed every time it sends a carriage return out the serial port. You can do that in BASIC with the instruction "POKE -2470,1." Poking a 0 into the same location will resume the normal Tandy mode—no linefeeds with carriage returns.

If you want to get formal about this, see Listing 1, which is a short program that turns the serial-port linefeed on and off.

Once the printer is connected, you print a text file by turning on the linefeed, and by "uploading" the file with the Telcom program.

Let's assume you want to print "SAMPLE.DO" with a 70 character line.

Turn on the linefeed. Go into Telcom. Set STAT to "58N2E"—that's what the printer wants: 1200 bits per second, 8 bits, no parity, and 2 stop bits.

After you've STAT, go to TERM and start to upload SAMPLE.DO. You'll be prompted for the width. Tell it 70.

The little printer is virtually silent, but it will go to work and put your file on paper.

The serial printer can also be used when you use your laptop for other things.

Want to print a listing of a BASIC program? Then hit F3, the save key. Tell it to save to "COM:58N2E" and your listing will roll off.

To modify a BASIC program that uses the customary parallel printer, you'll need to:

1. Add 1 to MAXFILES. That is, if MAXFILES = 3 then make it MAXFILES = 4. If there is no MAXFILES statement in the program, then add MAXFILES = 2 at the beginning.

2. Add a line that says "OPEN COM:58N2E FOR OUTPUT AS 2"—or if some other number, if other files or devices are using 2. Generally, the number you used at MAXFILES is the number you should use in this line.

3. Wherever there is an "LPRINT" statement in a program, replace it with "PRINT#2,." For instance, if you had:

70 LPRINT "Changing statements is tedious."

Then you should replace that with:

70 PRINT#2, "Changing statements is tedious."

Remember that the #2 here is just an example. You should use whatever number you assigned when you opened COM for output.

The next trick may be for someone to find a schematic of the little printer and modify it so that you can operate it off a battery. ●

```
==========================================================
5 ' COMLF -- Toggles linefeed with serial-port carriage return
10 CLS: DEFINT A-L: DEFSTR M-Z: A=-2470: M(0)="OFF":
   M(1)=" ON": N="Com linefeed is "
20 B=PEEK(A): C=1-B: PRINT@0, N;M(B):PRINT@45, "(T)oggle":
   PRINT @85,"(M)enu"
30 Z=INKEY$:IF Z="" THEN 30
40 IF Z="T" OR Z="t" THEN POKE A,C:GOTO 20
50 IF Z="M" OR Z="m" THEN MENU ELSE 30
==========================================================
```

Kimtron's MOS/30 continued from page 324

groups to a MOS30 multi-user system. The first is the Starter Kit consisting of the MOS30 Multi-user Operating Software and User Manual, and K-MAP, a small daughter board. The second group, called MOS30, contains a Kimtron KT-70/PC terminal, a reference manual, an Intelligent I/O board, and a 20-ft. serial cable. Each multi-user setup requires only one Starter Kit, plus one MOS30 for each user on the system.

There are separate K-MAP modules for the XT and AT systems. The CPU is removed from the motherboard and mounted on the K-MAP module, which then plugs into the CPU socket. While the current K-MAP/PC module will retrofit nearly any existing IBM-PC/XT or compatible system, the K-MAP/AT module will only work in PGA (Pin Grid Array) sockets. Many late model AT systems now use low-power CMOS versions of the 80286 CPU which have an LCC (Leaderless Chip Carrier) or PLCC socket. Making a K-MAP module for this type of socket requires a specially engineered adapter, but Kimtron expects to have one available by mid-1988. At that time, too, an 80386 version of the MOS/30 Operating Software is expected to be available. For reasons to be discussed in a few moments, a K-MAP module will not be required for the 386 version.

System Requirements

Before you can proceed with the installation of a MOS30 multi-user system, you need to remove (or disengage) system RAM and then add a memory board. Unfortunately, I didn't discover this fact until after my MOS30 system arrived, and I lost several weeks locating the right type of memory board for my PC/XT compatible. Since Kimtron's MOS30 is sold through dealers I must suppose that the dealer passes this information along to his customers. However, none of the advance literature I had been sent mentioned what kind of memory board would be needed.

A MOS30/PC system requires a memory board that is capable of bank switching. The current release of Kimtron's MOS30 software supports the JRAM-2X and JRAM-3 memory boards, which must be installed to increase the memory size above the XT's maximum memory limitation of 640K. The K-MAP module accomplishes this by mapping the memory address space to the expansion memory board. The memory address in the motherboard that can be mapped to the expansion memory is the unused memory portion before the expansion memory is installed. In order to allocate as much memory as possible to additional users, you should leave the minimum amount of memory (typically the base 128K) on the motherboard before the expansion memory is installed.

That means all RAM chips except the base 128K must be removed from the XT motherboard. The JRAM bank switched RAM board can then be mapped above the base memory of 128K. As a result each user may be allocated with up to 512K of memory space for application software. PC/MSDOS and K-MOS are loaded into base memory and shared by all the users. Certain PC/XT compatible systems depart from the original IBM motherboard design or use a passive backplane design (such as the Zenith models), and may have the first 256K of system RAM soldered directly to the CPU board. In this case, only 384K (640-256 = 384) can be made available for each user. This may be fine for some word processing applications, but isn't practical for major database or spreadsheets. It's advisable to stick to XT compatible hardware that let's you pop the RAM chip banks you don't want, and which allows you to substitute 64K chips instead of 256K in RAM banks 1 and 2.

An AT MOS30 system is simpler to set up. Any 16-bit extended (not "expanded" or LIM spec) board can be installed. The K-MAP module and the K-MOS software will allocate the memory as described in the K-MOS setup. Kimtron also recommends that 16-bit extended memory boards be installed as close to the power supply as possible to prevent timing problems that could arise in some AT systems. Setting a specific base memory by removing RAM chips is unnecessary in an AT system. You can do this through the computer's SETUP initialization program, which allows you to specify how much RAM you wish to allocate for base memory. All RAM above that base then becomes extended memory.

When MOS30 becomes available for 386 computers, a K-MAP module will be unnecessary, because the mechanism to map out base and extended memory within these systems is built into the

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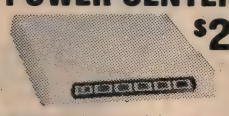

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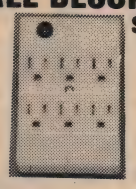

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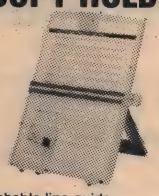

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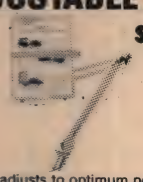

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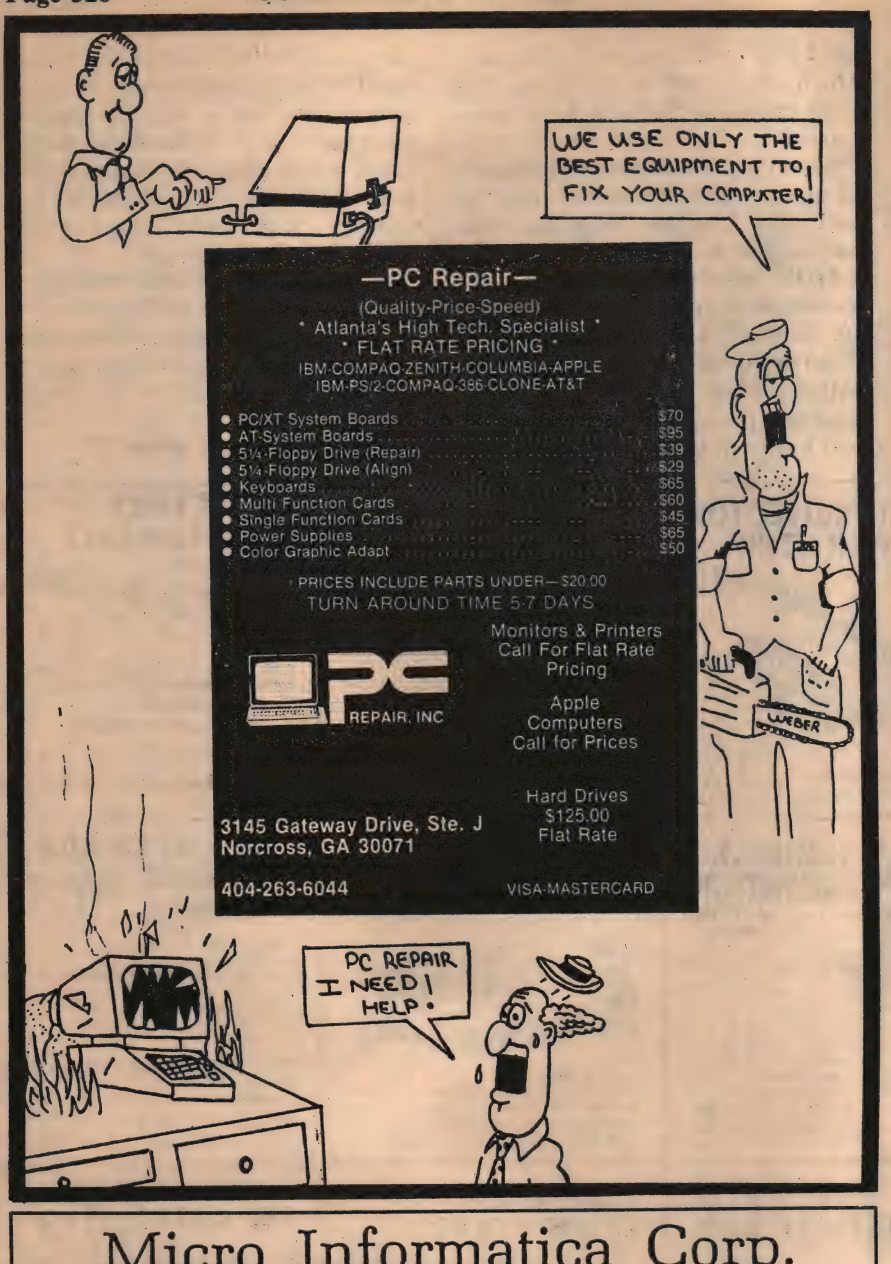

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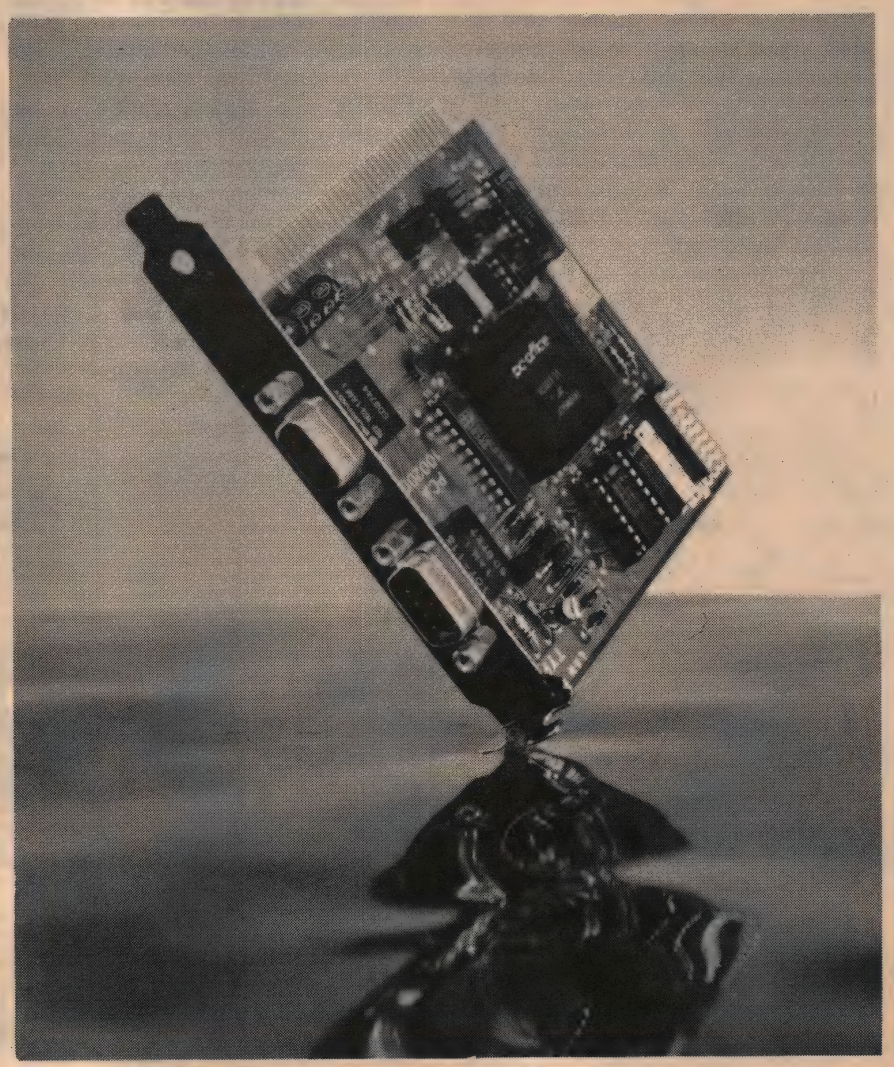

PC Office, Inc. has introduced the new NETBOARD II, a fast, streamlined network board for IBM PC/XT/AT computers. Small and efficient, NETBOARD II operates at 4.0 Mbps. and provides complete self testing diagnostics.

NETBOARD II's custom integrated chip (IC), performs all the basic networking functions. Numerous processor, memory, buffer and communications chips needed on previous network boards are no longer necessary. This revolutionary design combines 35 ICs into one, essentially creating a "network on a chip." The reduced number of chips on each NETBOARD II generates less heat, thereby enhancing reliability. NETBOARD II plugs into any half-card slot on IBM and IBM compatible computers.

In addition to the advanced hardware design, NETBOARD II implements a proprietary signaling technology which enhances transmission efficiency. A modified version of the Carrier Sense, Multiple Access with Collision Detection (CSMA/CD) signaling scheme provides increased throughput and error checking. Data streams include check bits which allow transmission of longer data blocks and reduce network overhead. Error checking occurs during data transmission rather than waiting for acknowledgement signals at the end of data packets.

NETBOARD II installation is completed in four simple steps, requires less than five minutes, and provides complete testing software. Test software is supplied with each NETBOARD II. This diagnostic software (PCN TEST) simplifies network installation and performs problem isolation during network operation. Designed with the end user in mind, PCN TEST eliminates the need for third party maintenance or specialized diagnostic hardware. With PCN, each component of the network is tested. Problems may be isolated to the NETBOARD, computer drives (including hard drives), cables, and peripheral devices (printers, plotters, etc.)

Intent on answering user needs for low cost, efficient networks, the PC Office Group maintains an aggressive posture toward the provision of network adapter boards that work with twisted pair wire. Full production begins within sixty days for two new versions of the NETBOARD II: designed for the IBM Micro Channel bus, PC Office's model MC2 operates on IBM PS/2 computers. The model S2-I contains high voltage isolation circuits for the European market where regulations require 2000 volt isolation circuits in all electronic communication equipment. Optional transmission speeds of 2.5 Mbps. or 4.0 Mbps. are available for all models of the NETBOARD II.

Completing the full spectrum of networking standards, Novell compatibility will be offered in May with the expanded family of NETBOARD II products. ●

Fastback Plus For MSDOS! Version 1.01 Released

Fifth Generation Systems, Inc. recently released a new version of Fastback Plus (Version 1.01) for the IBM PC/XT/AT, PS/2 and compatibles. Enhancements in this version were made following a survey of Fastback Plus users. "Speed and data integrity are the primary purposes of a quality backup system. But if it's really going to be used it must not be intimidating," said Barry L. Bellue Sr., president of Fifth Generation.

Improvements in Version 1.01 include: increased speed, improved DMA testing, greater PS/2 compatibility and enhanced error correction.

The original Fastback product was the first high-speed backup utility for the IBM PC. Since then, it has retained its market leadership position despite the emergence of low priced imitators. This leadership has been maintained because Fifth Generation is committed to leading edge technology, customer support and customer satisfaction. Fifth Generation understands the importance of preserving business data. "Our data security needs are the same as other businesses. Technical excellence in our products helps make our office run smoother. Fastback Plus leaves the imitators behind," said Bellue.

A survey of Fifth Generation Systems Inc.'s nearly half million users of the original Fastback for the IBM PC was instrumental in determining the data security needs of the business user and in shaping Fastback Plus.

Fastback Plus represents a major step forward in backup technology. It is a high speed PC backup program and it provides data compression without loss of speed. The data compression system significantly reduces diskette handling. The Advanced Error Correction can tolerate up to 13% damage to a backup diskette. Fastback Plus' pull down windows and keystroke macros make it simple for the new user. More experienced users are presented with advanced options through pull down windows. It allows backup to any DOS device including tape, cartridge or another hard drive.

Registered users of Fastback Plus Version 1.00 will automatically be sent the new version without charge.

For further information contact Fifth Generation Systems, Inc., 1322 Bell Avenue, Suite 1A, Tustin, CA 92680. 714-259-0541. ●

Kimtron's MOS/30 continued from page 325

microprocessor itself, and can be controlled directly by operating software. Do make certain, however, that the speed of the memory chips on any expansion board are equal to and not slower than the speed of the memory chips on your motherboard. If they're slower, you may develop timing problems.

Although MOS30 will support a maximum of 8 users, a more practical limit seems to be 5. The reason for this downscaling is not due to any problems with the K-MOS software; it has to do with the number of expansion sockets within a standard XT or AT. Even with the maximum of eight sockets, a minimum of three will be required for system use: the graphics display, the floppy/hard disk controller and the memory card. An XT will also require a serial/parallel I/O card, thus further reducing the number of available slots. An expansion chassis could, of course, be used to extend the number of users.

Each user on a MOS30 system has to be connected to his own intelligent I/O card. This is a microprocessor controlled I/O board using an 8MHz 80188 CPU that performs several key operations. It contains a small amount of video RAM to control the terminal screen refresh; and it provides a microprocessor controlled gateway between the terminal and system RAM. This frees the system's microprocessor to concentrate on host functions as well as disk and printer I/O control from each station. This method minimizes system degradation when multiple users are on line.

The final piece of hardware is the terminal. Users have a choice of ordering the KT-70/PC or the KT-22/PC. The KT-70/PC was the industry's first PC compatible terminal and it's now widely emulated by other manufacturers. When attached to a PC/XT, AT or 386, it will provide full emulation of a PC computer. It took the rest of the terminal industry nearly 18 months to realize that Kimtron had paved the way for inexpensive multi-user systems by designing a PC emulation terminal on which programs that write to the PC video RAM could run. The KT-70/PC is available in 14" green, amber and paper white screens. It has an 80 column by 25 line display and uses a 7x9 character matrix inside a 9x13 field for a razor sharp display. Characters are larger and are more clearly defined than either an EGA or TTL monochrome display.

The KT-22/PC is similar to the KT-70/PC, except that it has a 132 column by 25 line display, and is referred to as a MOS32 system. A MOS32 system uses the same MOS30 software. The KT-22/PC is capable of supporting a 38,400 baud rate, while the KT-70/PC is limited to 19,200 baud.

Putting The Pieces Together

Since all terminal workstations emanate from a common point of origin, the MOS30 system has to be set up in a "star" grouping. After the K-MAP module has been installed on the motherboard, the I/O cards for each terminal are plugged in. One end of the serial cable plugs into the DB9 connector on the back of the card, the other goes to the DB25 communications connector on back of the terminal. The KT-70/PC terminal also contains a sec-

continued on page 331

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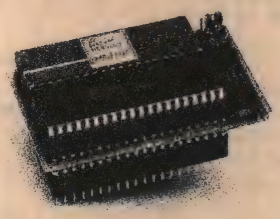

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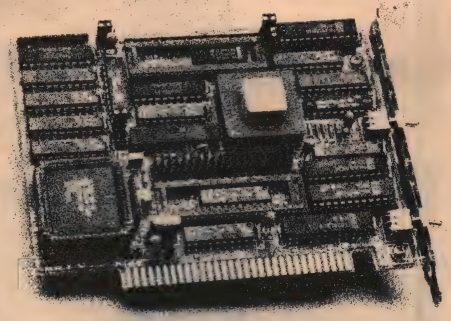

Cyclone 286

- 80286 16-bit processor!
- installs in seconds in a short slot!
- increases PC or XT speed up to 700%—faster than an AT!
- comes with 8K cache memory for zero-wait-state access!
- switchable to 8088 mode for full software compatibility!
- runs all software written for the IBM PC, XT, and AT*, including Lotus 1-2-3, Symphony, MultiMate, and others*!
- SI = 9.2
- available now!

just $300

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1 Year Warranty

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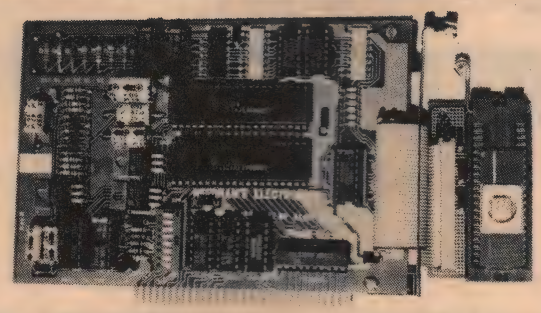
EPROM PROGRAMER
UPDATEABLE TO 32 MEG



Internal Card, 2 Ft. Cable

PC *New Intelligent Averaging Algorithm. Programs 64A in 10 sec., 256 in 1 min., 1 Meg (27010, 011) in 2 min. 45 sec. Internal card with external 40 PIN ZIF.

FOR PC $129.95 + Shipping

- Reads, verifies and programs 2716, 32, 32A, 64, 64A, 128, 128A 256, 512, 513, 010, 011, MCM 68764, 2532
- Automatically sets programming voltage.
- Menu driven software.
- Load and save buffer to disk.
- Updatable to 32 Meg Eproms.
- Editor with different entry modes including string and hex.
- No personality modules required.
- All chips socketed.
- 10 day money back guarantee.
- Quantity discount available.
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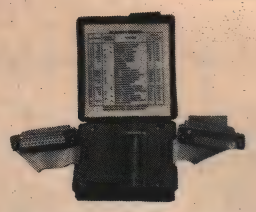
*Programming times may vary depending upon Eprom manufacturer.

BREAKOUT BOX



- Monitor RS232 Signals With Twelve Dual-Color Led's
- Twenty-Four Dip Switches For Enabling/Disabling Signal Lines
- No External Power Required
- Contains Jumper Wires To Reconfigure Signal Path

#78680 . . . . . **$44.80**

MICRO TESTER

- Monitor All 25 Signal Lines
- Red And Green LED's Indicate Signal Levels
- DB25 Male To Female

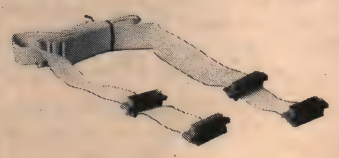
#38930 . . . . . **$36.85**

PC TOOL KIT

- This Kit Includes All Of The Tools You Need To Repair, Upgrade, And Maintain Your Computer
- Attractive Zippered Carrying Case

#38935 . . . . . **$27.80**

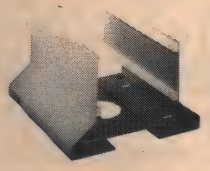
UNIVERSAL CABLE



- This Cable Will Always Plug In Regardless Of Gender
- DB25 Male And DB25 Female Connector On Each End
- All 25 Lines Passed Straight Through

#38370 . . . . . **$17.80**

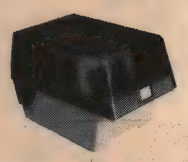
VERTICAL CPU STAND



- Position CPU Vertically Alongside Desk
- Adjustable To Hold CPU's From 3¼" to 6¼"
- Sturdy Steel Construction
- Beige Color

#38660 . . . . . **$27.65**

DISKETTE STORAGE CASES



- Flip-Top Filing System With Snap Lock Lid
- Anti-Static
- Organize Disk With Five Dividers

#38755 . . . . . 3½ 40 DISK . . . . . **$ 8.95**
#78665 . . . . . 5¼ 70 DISK . . . . . **$ 8.95**
#38465 . . . . . 5¼ 70 DISK/With Lock **$10.85**

UNIVERSAL PRINTER STAND

- Two Pieces Adjust To Any Size
- Accoustic Damper Pads Reduce Noise And Vibration
- Beige Color

#78670 . . . . . **$9.95**

PRINTER STAND WITH RECEIVING TRAY

- Polyester-Coated Steel Frame Construction
- Easy Access For Paper Handling
- Fits Most Printers

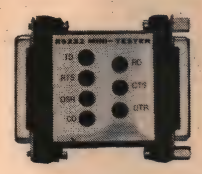
#78655 . . . 80 Column **$24.50**
#78660 . . . 132 Column **$27.95**

KEYBOARD DRAWER

- Drawer Has Ball Bearing Slides
- Locks Into Open Position
- Fits XT Type or AT Type Keyboards

#38670 . . . . . Desktop (Metal) **$58.45**
#38375 . . . . . Under-Carriage **$38.60**
#38380 . . . . . Wooden (Oak) **$58.45**

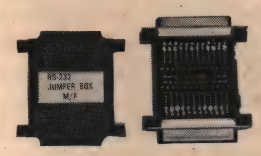
RS232 MINI TESTER



- Monitor The Status Of TD, RD, RTS, CTS, DSR, DTR, CD
- All 25 Connectors Wired Through
- DB25 Male To DB25 Female

#38685 . . . . . **$10.95**

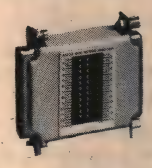
JUMPER BOX



- Solder Type
- Make Custom Wiring Configurations
- Comes Complete With 25 Jumper Wires
- DB25 Connectors

#78645 . . . . . Male to Female **$7.85**
#38740 . . . . . Male to Male **$7.85**
#38940 . . . . . Female to Female **$7.85**

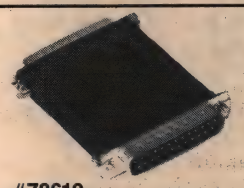
SOLDERLESS JUMPER BOX



- No Soldering Required Just Insert Wire Into Socket
- Comes Complete With 25 Jumper Wires
- DB25 Connectors

#38745 . . . . . Male to Female **$9.65**

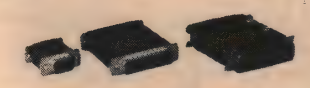
NULL MODEM



- Allows Two Computers To Communicate Without The Use Of A Modem
- DB 25 Connectors

#78610 . . . . . Male to Female **$6.95**
#38385 . . . . . Female to Female **$6.95**

GENDER CHANGERS



DB9 PIN
#38310 Male to Male **$4.25**
#38315 Female to Female . . . **$4.25**

DB25 PIN
#38620 Male to Male **$5.95**
#38625 Female to Female . . **$5.95**

CENTRONIC (36 PIN)
#38730 Male to Male **$8.95**
#38735 Female to Female . . **$8.95**

DISK DRIVE HEAD CLEANING KIT

- Can Be Used On Single Or Double Sided Drives
- Can Be Used Up To Fifteen Times
- Contains One Cleaning Diskette And One Bottle Of Cleaning Fluid

#38750 . . . . . 3½ DISK **$4.85**
#38675 . . . . . 5¼ DISK **$3.75**

MODEM PROTECTOR

- Protect Your Modem From Spikes & Surges On The Telephone Line
- RJ11 Connections

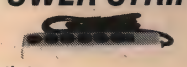
#38395 . . . . . **$12.95**

AT GENDER CHANGER

- DB9 Female to DB25 Male

#38390 . . . . . **$6.85**

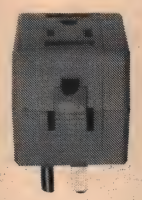
POWER STRIPS



- Six Outlets
- 15 AMP Circuit Breaker With Reset
- Beige Color

#78650 . . . . . **$9.95**
#38135 . . Surge Protected . **$18.75**
#38470 . . Surge/EMI/RFI . . **$23.85**

SPIKE PROTECTOR



- Helps Protect Electronic Equipment From Transient Spikes
- MOV (Metal Oxide Varister) Protection
- Three Outlet

#38690 . . . . . **$4.95**

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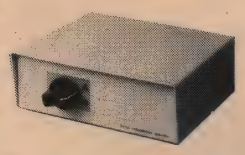
DATA SWITCHES



- High Quality Rotary Switch
- All Pins Switched
- Fully Shielded
- Female Connectors
- Six-Month Limited Warranty

'87 Computer Shopper Best Buy of the Year

TWO POSITION (AB Type)

#38610	DB 25 Pin	$27.95
#38640	Centronics 36 Pin	$28.95
#38700	DB 9 Pin	$34.50
#38325	DB 37 Pin	$49.65
#38460	DB 15 Pin	$36.80
#38612	8 Pin Mini Din (MAC)	$39.50

FOUR POSITION (ABCD Type)

#38615	DB 25 Pin	$39.95
#38695	Centronics 36 Pin	$41.95
#38618	DB9	$49.65
#38445	8 Pin Mini Din (MAC)	$49.65

CROSSOVER (X-Type)

#38650	DB 25 Pin	$43.50
#38655	Centronics 36 Pin	$45.95
#38440	DB9 Pin	$49.55

3 TO 2 DATA SWITCH

- Allows Use Of Three Input Devices And Two Output Devices or Vice Versa

#38330 . . . . . DB 25 Pin $69.85

CABLES

DB25 Pin Male to DB25 Pin Male

#78640	3 ft	$ 6.85
#38605	6 ft	$ 7.95
#78620	10 ft	$ 9.95
#38025	15 ft	$14.90

DB25 Pin Male to DB25 Pin Female

#38630	6 ft	$ 7.95
#78625	10 ft	$ 9.95
#38060	15 ft	$14.90

Centronics 36 Pin Male to 36 Pin Male

#38680	6 ft	$ 8.95
#78685	10 ft	$10.95
#38095	15 ft	$18.65

Centronics 36 Pin Male to 36 Pin Female

#38665	6 ft	$ 8.95
#78695	10 ft	$10.95
#38120	15 ft	$18.65

PC Printer (DB25 Pin Male to Centronics 36 Pin Male)

#38645	6 ft	$ 8.95
#78630	10 ft	$10.95
#38715	15 ft	$16.95
#38005	25 ft	$24.90

Right Angle Printer

#38320	6 ft	$ 9.85
#38405	10 ft	$11.90

At Modem (DB9 Pin Female to DB25 Pin Male)

#38751	1 ft	$ 6.85
#38752	3 ft	$ 8.35
#98605	6 ft	$10.95

DB9 Pin Male to DB9 Pin Male (Monitor)

#38210	6 ft	$ 8.90
#38215	10 ft	$12.85

DB9 Pin Male to DB9 Pin Female (Monitor Extension)

#38230	6 ft	$ 8.90
#38235	10 ft	$12.85

- We also stock many Apple cables.
- Please call for longer length or custom cables.

KEYBOARD EXTENSION

#78635	6 ft	$3.95
#38400	12 ft	$6.35

MONITOR POWER EXTENSION

#38220 . . . . 6 ft $5.65

MONITOR POWER ADAPTER

#38335 . . . . 3 ft $4.90

POWER CORD

#38340 . . . . 10 ft $4.90

SKC DISKETTES

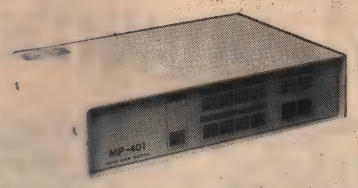
- Lifetime Warranty
- 100% Certified Error Free

#39035
5¼" Double Side Double Density . . $ 9.65

#39040
5¼" Double Side High Density . . $17.50

#39045
3½" Double Side Double Density . . $19.50

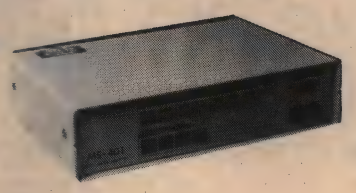
PARALLEL SMART SWITCH



- Automatic Data Switch Which Allows Multiple Computers To Output To One Printer
- Selectable Auto/Manual Operation
- Scans Inputs Every 10 Milliseconds
- Female DB25 Connectors

#38710	4 to 1	. . . .	$138.55
#38760	8 to 1	. . . .	$188.85

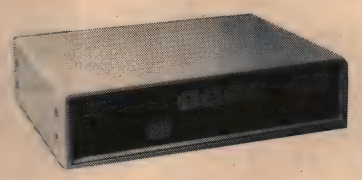
SERIAL SMART SWITCH



- The Dalco Serial Smart Switch Offers A Low Cost Way For Multiple Computers To Share A Serial Printer
- No Special Software Required
- Selectable Auto/Manual Modes Of Operation
- Female DB25 Connectors

#38711	4 to 1	. . . .	$158.85
#38761	8 to 1	. . . .	$208.85

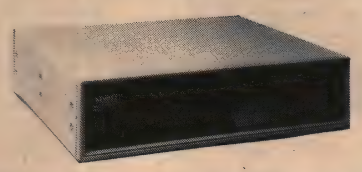
SMART SWITCH (4 to 2) WITH BUFFER



- Share Two Printers From Four Computers
- Also Includes Built-In 256K Buffer With Multiple Copy Feature
- Alphanumeric Display
- Autoscan Or Manual Mode
- Parallel Inputs And Outputs

#38345 . . . . . $324.55

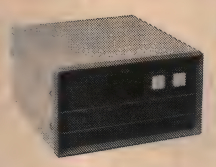
SMART SWITCH (6 to 4) WITH BUFFER



- Share Up To Four Printers From Up To Six Computers
- Software Or Manual Control
- 256K Buffer Expandable To 512K
- Parallel Inputs And Outputs

#38350	256K	. . . .	$416.67
#38430	512K	. . . .	$468.65

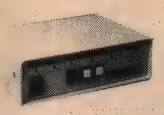
SERIAL PRINT BUFFER



- Supports RS232 Or Xon/Xoff
- Make Up To 99 Copies With The Copy Feature
- Alphanumeric Display
- Female DB25 Connectors

#38355 . . . . . 256K $287.35

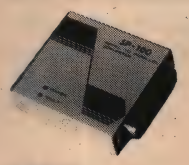
PARALLEL PRINT BUFFER



- Includes Multiple Copy Function
- LED Display
- Female Centronics (36 Pin) Connectors
- Heavy-Duty Metal Case
- Beige Color

#38635	64K	$ 98.50
#38420	64K with AB Switch	$119.80
#38705	256K	$189.50
#38435	256K with AB Switch	$209.50

INTERFACE CONVERTER



- Convert What You Have To What You Need
- Baud Rate Selectable
- DTE Or DCE Selectable

#38720	Parallel to Serial	$69.50
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CMS Network Management Software

Racal-Milgo has introduced CMS PC-Link, a full featured software emulation of its Communications Management Series (CMS) network diagnostic terminal, for IBM, IBM compatible, and laptop personal computers (PC). When CMS PC-Link software is loaded into a compatible machine, the user has full color access to CMS.

CMS PC-Link provides flexibility and cost savings for network personnel at central site who may want the option of accessing CMS using already available PC or laptop equipment.

CMS PC-Link is also convenient for network personnel who may have a need to access CMS from their PCs or laptops either at home after business hours or when travelling. Using CMS PC-Link, their PC or laptop, and a Racal-Milgo RM-1822 dial-up modem, network personnel can access CMS and communicate with remote sites across the same time zone, or different domestic or international time zones.

CMS PC-Link on IBM PS/2

Besides allowing the user full CMS network diagnostic, control, and restoral functions, the CMS PC-Link product can also be configured to support a second port. This means that by depressing one key, the user can access other Racal-Milgo network management products such as the CMS Matrix Switch, CMS SPAN (System Performance Analyzer), and the CMS Gateway 1 product. CMS Gateway 1 provides access to CMS and any IBM host application as, for example, Netview and CICS. One port supports either CMS or SPAN applications. However, two ports are required if both applications are to be run simultaneously.

Available in both 3½" and 5¼" diskettes, CMS PC-Link also supports color printing on Tektronix printers or Diablo color Ink-jet printers. This option allows the operator to make color graphic hard-copy management reports of any CMS, LQA (Line Quality Analysis) or CMS SPA (System Performance Analyzer) screens. CMS PC-Link offers the capability of supporting a basic color graphics board or alternatively, an enhanced graphics adaptor, depending on color resolution desired. Color graphics provides the user with a tool to ease the task of system fault isolation and trouble shooting.

CMS PC-Link is currently available at a single unit cost of $1,500.

Racal-Milgo is an international designer and supplier of integrated communications systems for airlines, financial institutions, commercial, shipping, government, and other organizations. The company provides maintenance and support services for its digital, analog, and fiber optic products that include, digital service units (DSU), modems, multiplexers, T1 devices, X.25 products, network management systems, and data encryption devices.

For more information contact: Racal-Milgo, 1601 N. Harrison Parkway, Sunrise, FL 33323-2899; Telephone (305) 475-1601. ●

MOTHERBOARD

386 AT M/B (16MHZ, 1MB RAM)..... call
286 AT M/B (6/12MHZ, 1MB RAM).... $590
286 AT M/B (6/10MHZ, 0K)..... $250
TURBO XT M/B (4.77/10MHZ, 0K)..... $77
TURBO XT M/B (4.77/8MHZ, 0K)..... $72
PC XT M/B (4.77 MHZ, 0K)..... $67

POWER SUPPLY

150 Watt Power Supply..... $42
180 Watt Power Supply..... $52
200 Watt Power Supply..... $62
220 Watt Power Supply..... $65

KEYBOARD

84 Key AT/XT Keyboard..... $42
101 Key Enhance Keyboard..... $53

FLOPPY DRIVE

Teac 360K Drive..... $82
Fujitsu 360K Drive..... $74
Teac 1.2MB Drive..... $92
Fujitsu 1.2MB Drive..... $88

ACCESSORIES

Joy Stick..... $19
Logitech Mouse..... $75
Printer Cable..... $9
MS DOS 3.3 w/GWBASIC..... $90
IBM DOS 3.3..... $100
1200 Baud Internal Modem..... $78
2400 Baud Internal Modem..... $130

ADD-ON CARD

Floppy Controller Card..... $20
Multi I/O Card for XT..... $52
I/O Plus Card..... $45
Monographic W/Printer port..... $42
Color Graphic Card..... $44
Enhance Graphic Card..... $115
Printer Card..... $18
RS232 Card..... $20
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MONITOR

Packard Bell Mono Monitor..... $74
Samsung Mono Monitor..... $74
Samsung Color Monitor..... $245
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Kimtron's MOS/30
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ond, or auxiliary, connector that can be used to connect a printer or other hardcopy device dedicated to that station. Printer hardware that will be used by all stations must be connected to the host.

Although the physical joining of the hardware is relatively simple and straightforward, all I/O cards must be configured to a separate I/O address. The termination resistor and the IRQ line must also be set. The front end of each card has a jumper block. The top row of pins are labelled T1, which designates the termination resistor. This only has to be set for the first I/O card. The jumper shunt for all other I/O cards must be removed. Underneath, there are four additional sets of pins marked IRQ2 through IRQ5. They're preset to IRQ5 at the factory, which is the default setting for a MOS30 system running on an AT. When an XT is used as a host, the jumper shunt should be moved to the IRQ2 position.

The base I/O address port for each card can be selected through an 8-position DIP switch in the middle of the card. Each card has been preset at the factory to port 330H. Using the HEX ranges recommended in the documentation for XT and AT systems, you refer to a three-page chart in the back of the manual, and select a consecutive series of port address for each card. As you set the DIP switches on each card, enter the same information on a chart within the manual, because you will have to record this information during the software installation.

The recommended base port addresses should avoid conflict with port addresses used by the computer's CPU board and by most standard plug-in cards. However, it is advisable to double check the documentation for your computer and your installed plug-in cards and compare their port addresses with the ones you plan to use with the MOS30 system.

Finally, you have to configure each terminal. Those of you who have worked with ASCII terminals are probably aware that this can often be a grueling exercise in confusion. However, since the two Kimtron terminals default to a PC emulation mode, there is very little to do. After you plug in the keyboard and power up the terminal, you press the ALT-CAPS LOCK keys on the KT-70/PC or the CTRL-ALT-CAPS LOCK keys on the KT-22/PC to enter the Terminal SET-UP mode. Just verify that the baud rate is set to 19,200 on the KT-70/PC, and that the communication handshake is set to XPC. On the KT-22/PC these should be 38,400 and XNF. Follow the instructions to save these settings before exiting the SET-UP mode. Now you can plug a terminal into each I/O card and proceed to the software installation.

Setting Up The Software

Although technical information on the K-MOS Multi-user Operating Software is not supplied within the documentation, it appears to be based on network-type programs that allocate specific blocks of memory to each user, plus a time-slice algorithm (or Time Tick) so that each user and on-line printer can share the resources of the host's microprocessor.

Installing K-MOS isn't difficult, but it does take some planning. As I mentioned earlier, use the SET-UP diagnostic program that came with your AT to set the new memory size for the system based on how much memory you are adding with the extended memory board. Then boot up and go into the root directory and temporarily disengage the AUTOEXEC.BAT file by renaming it AUTOEXEC.TMP. Modify the CONFIG.SYS file to include:

FILES = 50
BUFFERS = 20

These numbers may vary depending on the requirements of the application software that you plan to use. You may have to adjust these parameters at a later date if you suspect that an application is sluggish.

With an XT, also disengage the AUTOEXEC.BAT file, and add the following to the CONFIG.SYS file:

DEVICE = JBOOT.BIN 640K
FILES = 50
BUFFERS = 20

JBOOT.BIN 640K is the expansion memory device driver for the JRAM board which is manufactured by Tall Tree Systems. Kimtron's technical support group advised me that other paged-memory expansion boards will probably work with MOS30, providing that they function similarly. I would recommend that they be contacted so they can verify the acceptability of another board before you purchase it.

Now you can create a K-MOS subdirectory and copy all the files from the distribution diskette to the subdirectory. You may also wish to make several back-up copies of the distribution software and put them away for safe keeping. Create a temporary PATH using the COPY CON: command, which should read PATH = C:\;C:\KMOS.

The first order of business will be to configure K-MOS for a multi-user system. Starting in the root directory, type:

KMOS/U

The system will display the following menu on your screen:

F1. Set user configuration
F2. Set printer configuration
F3. Save configuration
F4. Start K-MOS
F5. Return to DOS

When the F1 key is pressed a chart containing boxes will appear. These allow you to enter specific information about each user, including the Base Address, type of Display (mono or color), Keyboard Type, Mem Size (in kilobytes), Clock Tick, Terminal and Baud Rate. User 0 always refers to the host. Terminal users are numbered 1 through 7.

Let's capsulize some of these:

Base Address: The host system address is 0. Additional on-line users will be distinguished by the base address port that was preset on the I/O board.

Display: IIO (which stands for Intelligent I/O) is entered for each terminal. The host display can be mono

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Kimtron's MOS/30
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or color depending on the type of display resident in the system.

Keyboard Type: Usual entry is PC, unless a special keyboard was ordered for the terminals.

Mem Size: For the XT or AT host you can specify 640K. The operating software will automatically recalculate how much the host system will actually have available based on how much memory DOS and the K-MOS software uses. In this lump sum the amount of memory used by system overhead, such as device drivers, batch and config files. K-MOS works with DOS versions 3.1, 3.2 and 3.3. When the recalculation has been performed, the host user will usually have between 512K to 550K available. Each terminal user can be allocated up to 512K. If each user will be assigned a specific program that can run in smaller memory, that value can be entered instead. Whatever memory size is specified, it must be a multiple of 64. If it isn't, K-MOS will enter the next highest value that is a multiple of 64.

Clock Tick: Enter 1 for each user.

Terminal: Both the KT-70/PC and KT-22/PC can reside within the same multi-user system. MOS30 is specified for the former, and MOS32 for the latter. The KT-22/PC could be assigned exclusively to spreadsheet and accounting stations because of the wider display.

Baud Rate: Enter the maximum baud rate for each type of terminal. You will not have a problem using 19,200 baud for the KT-70/PC terminals, and 38,400 baud for the KT-22/PC's, because each is independently controlled by its respective I/O card.

The top of the chart displays the amount of total system memory as well as how much memory you have available for allocation.

After all the users have been configured, you place the cursor to the first user on the number block, and press the ESC key. This brings you into the IRQ selection option in which you specify the IRQ number for each user. You exit the system configuration menu and return to the main menu. Press F2 to enter the printer configuration menu.

Here you specify how printers have been attached to your system by entering Y or N in the appropriate user box. Printers that are local to the host can be serial or parallel, and can be used by all stations. Printers that are local to a terminal, and connected through the aux serial port, can only be used by that station. Serial printers will have to have their parameters set up through the DOS MODE command. This isn't necessary with parallel printers.

You can also add up to two printer spoolers, or a dual-mode serial/parallel spooler. A special box within the Set Printer Configuration menu requires that certain specs be listed for these units: port type, base address, clock tick, baud, parity, etc., that apply to the respective spooler type.

When you complete these steps, return to the main menu and select F3 to Save the configuration. This will automatically create a KMOS.DAT file in the present directory.

The Operating Mode

The K-MOS operating software can be set up to run from a keyboard command, or automatically through the boot process by creating an AUTOEXEC.BAT file in the root directory with the following:

PATH
SHARE
K-MOS
Prompt

The PATH information was given earlier. SHARE sets up the record and file locking mechanisms. You can also automate the boot process for all user stations so that specific programs will be loaded, by creating an AUTOEX01.BAT file for user 1, AUTOEX02.BAT file for user 2, and so on. You may include specific parameter data that might apply to each user's application, including a PATH for a user's own subdirectory. All terminals on a MOS30 multi-user system must be turned on before the host is booted.

K-MOS has a neat feature that allows individual users to reset their own station through the CTRL-ALT-DEL warm boot key sequence. Doing so will not effect any other users on the system. However, the same procedure on the host will reset every user. If a user station locks up, the host can issue a REBOOT n (n being the user number) command to reset that station.

Users can communicate with one another through the Write command. When a Write command is directed toward a user station, the message will appear in reverse video on the 25th line, on a line by line basis.

Summing Up

You can run most applications that write to the video RAM even on the terminal workstations. This includes popular business programs such as Lotus 1-2-3, dBase III Plus, Multimate, Wordstar Professional, and even Sidekick.

The MOS30 multi-user system doesn't perform fancy tricks like some of the mega-systems on the market, but it's easier to set up and use. In fact, the entire installation is so deceptively simple that your first reaction is one of skepticism because the User's Guide is a scant 33 pages. However, MOS30 and the K-MOS software is less involved than many application programs, and an average user should not have any problems setting up this system.

The price of the Starter Kit (the MOS30 operating software and K-MAP module) is $199 for the XT version and $299 for the AT version. A MOS30 system (the KT-70/PC terminals, I/O card and cable) has a list price of $799. A MOS32 system (which substitutes a KT-22/PC terminal) is $949.

For additional information, please contact: Kimtron Corporation, 1709 Junction Court, Bldg. 380, San Jose, CA 95112-1090. (408) 436-6550. ●

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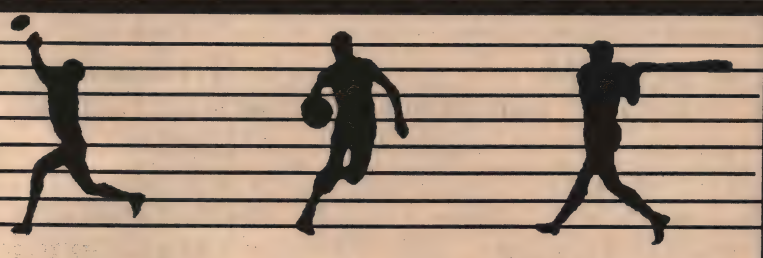

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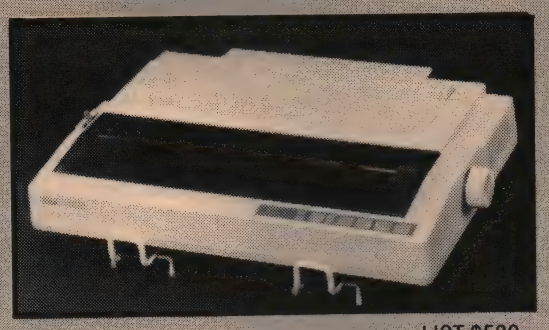

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Hercules To Ship Network Card Plus

Hercules Computer Technology announced that they will begin shipping the Hercules Network Card Plus next month. This new PC add-in board will combine industry-standard Hercules high-resolution graphics, including Hercules RamFont mode, with an AppleTalk network port. This integration of video and networking frees an additional card slot and saves PC users the cost of separate network card.

This new monochrome card is an easy and inexpensive solution for small or medium-sized businesses as well as large corporations who want to network PCs to other PCs, Apple Macintoshes, and Sun UNIX-based systems using TOPS network software (the Network Card Plus is compatible with TOPS higher speed FlashTalk mode of operation). Because it combines graphics and networking capabilities in one card, users will save the cost of purchasing separate video and network cards. It also allows users to share costly resources such as laser printers, like the Apple Laserwriter, and hard disk storage.

The Network Card Plus combines all of the graphics and text functionality of the widely-used Hercules Graphics Card Plus: Hercules standard 720x348 pixel resolution; full compatibility with hundreds of software packages; and RamFont, Hercules proprietary technology that combines the versatility of graphics mode with the speed of text mode.

RamFont, available exclusively from Hercules, provides the first true alternative to the text mode/graphics mode tradeoff. Software can manipulate up to 3,072 custom characters of virtually unlimited style and assign attributes such as strike through, boldface and underline with RamFont. Graphics elements and custom characters can be scrolled or moved at speeds previously associated only with text mode. Graphics can also be mixed with text and foreign language alphabets.

Today, over 60 software packages take advantage of RamFont's advanced video capabilities. Spreadsheets, such as Lotus 1-2-3, can display more information with almost twice the scrolling speeds of graphics mode. Word processors, such as WordPerfect 5.0, can display numerous attributes, fonts and special characters in the normal editing mode. Other popular software pacakges featuring RamFont support include Lotus' Symphony and Manuscript, MicroPro's Wordstar 2000 Plus Release 3.0, Microsoft's Word and Multiplan and Ashton-Tate's Framework II.

The Network Card Plus represents the first foray for Hercules outside the PC video card marketplace. "We consider the card both an entry into Apple world and a good initial step toward diversification," said Jim Harris, Hercules president. "Once the Network Card Plus is established, we also intend to add networking functionality to our InColor Card technology and to consider it for future products as well."

In the first part of April, Hercules bundled a limited number of Network Card Plus boards with TOPS/ DOS software, and connectors from Farallon Computing at a special introductory price.

Customers can get the name of their nearest Hercules dealer by calling toll free (800) 532-0600. The Network Card Plus comes with the standard Hercules two-year warranty and has a suggested retail price of $369.

Headquartered in Berkeley, Calif., Hercules designs, manufactures and markets products that bring optimized graphics to PCs. For more information, contact Hercules Computer Technology, Inc., 921 Parker Street, Berkeley, CA 94710. Phone (415) 540-6000.

TOPS, a division of Sun Microsystems, is headquartered in Emeryville, Calif. Farallon Computing is headquartered in Berkeley, Calif. ●

Microsoft Ships MS OS/2 Software Development Kit

Microsoft Corporation recently announced the shipment of the latest update of the Microsoft OS/2 Software Development Kit (SDK). The update includes a complete set of MS OS/2 documentation, a pre-release of the MS OS/2 version 1.1 operating system, and the development tools necessary to begin development and testing of MS OS/2 Presentation Manager applications.

This release of the MS OS/2 SDK is the third update to be released by Microsoft since the first shipment of the SDK in June 1987. Microsoft plans to ship further updates to the SDK prior to final release of MS OS/2 version 1.1.

"This OS/2 SDK update is a major milestone for Microsoft," said Steve Ballmer, vice president of systems sottware. "It accomplishes our goal of providing developers with early access to a platform for designing, developing and debugging OS/2 Presentation Manager applications. Although this pre-release of the software still contains bugs, we are confident that the development community can make good progress in developing the great applications software that we expect to be available for the Presentation Manager environment."

The SDK update comprises more than 10,000 pages of documentation and will be shipped in both 3.5-inch and 5.25-inch media formats—a total of 63 diskettes. The update includes: MS OS/2 version 1.1 The first pre-release of the Microsoft OS/2 Presentation Manager, the graphical user interface for the OS/2 systems.

MS OS/2 Programmer's Toolkit. Provides software development tools and utilities, sample programs and reference materials.

Microsoft Windows SDK version 2.03. The latest version of the Microsoft Windows Software Development Kit for developing applications using either Windows 2.0 or Microsoft Windows 386. The Windows SDK includes valuable additional development and tutorial material relevant to the Presentation Manager environment.

Microsoft C and MASM version 5.1. The most recent versions of Microsoft C and Microsoft Macro Assembler for OS/2, which allows developers to write and debug OS/2 applications.

The Microsoft OS/2 SDK is priced at $3,000. The price includes all the components listed earlier, plus a DIAL account, Microsoft's on-line technical support service, and eight two-hour videotapes on OS/2 development topics. If one full-price kit is purchased, additional kits can be purchased without the DIAL account for $1,500 each. DIAL can be added for $700 each. All OS/2 SDK licensees receive updates at no cost, including this latest update.

For further information contact Microsoft Corporation, 16011 NE 36th Way, Box 97017, Redmond, WA 98073-9717, 206-882-8080. ●

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Interleaf Relationship With IBM For New Publishing Products

According to the terms of a strategic development/marketing agreement announced recently, IBM will address the publishing needs of a broad range of business and technical professionals with new software packages developed by Interleaf for IBM.

The first product to ship—IBM Interleaf Publisher—is full-featured electronic publishing software for the IBM PS/2 Model 80. IBM will market IBM Interleaf Publisher as its publishing solution designed for the majority of corporate and technical professionals producing business documents. IBM Interleaf Publisher will ship in May, 1988. Also announced was IBM Interleaf Publishing Series RT PC Edition.

According to the agreement announced, Interleaf will develop publishing software products for a range of IBM computers. Based in Cambridge, MA, Interleaf is a pioneer developer of easy-to-use, integrated text and graphics publishing software.

At a press conference, Jeff Mason, General Manager of IBM's Publishing Systems Business Unit, said: "These Interleaf offerings bring a new standard of publishing power to the broadest range of users. We're especially pleased to have the Interleaf product available on the IBM PS/2 Model 80 under PCDOS and under AIX on the RT PC."

Interleaf's President, David Boucher, said: "Perhaps the most significant aspect of this announcement is that the leader in information technologies and the leader in publishing technologies have joined forces. Together we are developing and making available the next generation of electronic publishing—providing integrated, corporate-wide publishing solutions."

These publishing products will be available through the IBM sales organization, from Interleaf sales representatives, and through a select group of authorized PS/2 dealers.

Unlike the current generation of desktop publishing systems which enable users to create highly-designed pages by hand, IBM Interleaf Publisher is an integrated publishing system which automatically lays out the document according to the user's specifications. It does this as the user is creating or revising text or graphics, so that the on-screen representation of the document is always up to date. If a new paragraph has to be inserted into page one of a 500-page document, Publisher will re-cut and paste the entire document if necessary to accommodate the new material.

These capabilities make IBM Interleaf Publisher a complete solution for producers of the vast majority of corporate documents, such as: speeches, 50-page contracts, 100-page price books, 150-page directories, 200-page users manuals, 300-page financial reports, 400-page marketing studies, and multi-volume strategic plans.

IBM Interleaf Publisher provides full functionality word-processing including features to speed the production of long documents produced by workgroups: unlimited document length, automatic hyphenation and spell verification, automatic generation of indexes and tables of contents, automatic cross-referencing, automatic multi-level numbering and outlining, revision tracking, and the ability to accept files from most of the major office word processors.

IBM Interleaf Publisher's graphic capabilities enable users to create sophisticated graphics from simple shapes; to accept scanned drawings which can then be altered at the most minute level; and manipulate scanned photographs by sizing, stretching, annotating and rotating; and to generate a wide variety of business charts automatically.

Interleaf also announced IBM Interleaf Publishing Series RT PC Edition, an upgraded version of Interleaf's TPS (Release 4). IBM will market a core version of the product intended to be used primarily by groups of writers whose systems are networked. Two optional programs—Document Management and Advanced Graphics—will be available directly from Interleaf.

Priced at $2,495, IBM Interleaf Publisher uses an 80386-based IBM PS/2 Model 80 with a minimum of 6 megabytes of RAM and a 40 megabyte hard disk. Publisher will ship in May. IBM Interleaf Publishing Series RT PC Edition is priced at $6,595 and will be available from IBM in October.

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Softgraf Runs CGA On Mono-Monitor

Sunrise-Littleton Corp. announces the release of Softgraf Version 3.1.2. Softgraf is a software solution that enhances the capability of a Monochrome PC by allowing it to run CGA color graphics software and games. Softgraf does this by setting the system's flags for a CGA environment and reducing the projected area size slightly so that the monochrome pixel coordinates match that of a genuine color monitor and card. Colors appear as tones of amber or green.

Softgraf is initialized from a simple startup menu. One of the options provided lets users run copy protected, Self-Booting programs from Drive A:.

Softgraf now supports over 95 percent of commercial and public domain software, as well as most development languages, business graphics programs, editors, games, and compiled programs.

The upgraded version commits about 11.3K of RAM, and continually senses to determine if CGA or Mono graphics signals are being sent to the screen. Then Softgraf instantly auto-switches to either CGA or Mono mode. This allows the user to run a CGA application, followed by a program configured for Monochrome, without having to de-install Softgraf from memory.

Softgraf is not copy protected, has a suggested price of $29.00, and is available from Sunrise-Littleton Technology, 15200 Shady Grove Road, Rockville, MD 20850. (301) 963-0341. ●

C' Prime
continued from page 192

thing libutil doesn't do, which I wish it did, is to delete modules from a library. Now the only way to do that is to seperate all the modules and then put them all back together leaving out the ones to be deleted.

The last program, ved, is a screen editor. For the most part it works. However, for anyone who has ever used any other editor, particularily one that uses the arrow keys, then they will have a problem. I constantly find myself pounding on the arrow keys until I realize nothing is happening. Additionally, it doesn't check a file to see if it is a text file or binary. Which means that when I forget to add the suffix ".c" I end up in a binary file which does all sorts of strange things.

The Documentation

Where should I start? The documentation is poor to say the least.

A good deal of the documents are devoted to teaching someone who has never used C before how to use it. For, instance the section on starting up in C is excellent. However, like I already pointed out, the programs for doing this are scattered haphazardly around the four disks that come with the package. Unless the user has had extensive experience using DOS and Apple they are going to be very intimidated and might never get to the point where they can follow the start up tutorial. The disks should have labels and the first two should have the necessary programs on them and only those programs. A hint, to use ved you want to use the one with the shorter length.

The documentation has no index. However, it does have a long section which is called "Style" which appears to be a general introduction to the language C. However, certain things are left out. For instance, it fails to tell anywhere that "pr:" must be opened as a file in a program if the user wants to use the printer. A new user to C might never figure this out, but it is something that I would consider essential information for a new user.

There are also examples that don't work. One is a command in the shell which calls the monitor (call -151). It does go somewhere that looks like the monitor, but none of the monitor commands seem to work. Also redirection (i.e. input comes from a file rather than the keyboard) will eliminate all of the arguments on a command line unless the redirection is at the end of the line. Yet, examples are given which clearly show arguments after the redirection.

And there is one amazing ability which I can only assume was left out of the documentation by mistake. There are two directives called #asm and #endasm which allow the user to imbed assembly language code directly in the C code. However, neither of these is mentioned anywhere. I have found them very useful and I would suppose others would also, yet they have to be known about first.

There are some amazing things in the libraries. There is no list which details which functions are in which libraries. I have already had problems once with that lack. Also, in the section on the c65 compiler it details how to compile a program for overlays, but fails to mention what an overlay is, but it does refer the user to the technical section. The technical section has nothing on overlays. However, there is one routine in the libraries, execl, which does give the user enough information. There are also several library routines which, from their description, appear to do exactly the same thing. It could be that they are there to provide compatibility with other versions of C. However, if that is the case then it should say so.

There is a system routine which is supposed to call system routines (like rm) and then return to the program. At least that is how it is described in the Kernighan/Ritchie description. C' Prime does the command call correctly, but it never returns to the calling program. This very well could be a problem with how DOS is implemented, but without complete documentation it is hard to tell.

C' Prime is also described as an earlier version of C that they are currently selling for a much higher price. I would assume that they have located some bugs in this version and fixed them for the newer version (like any program with a large amount of code). I have no problem with a buggy version as long as I know what the bugs are. It certainly would have been nice to have an errata sheet enclosed describing the known bugs.

These are all things which a programmer can work around once they are known. But since the documentation either doesn't describe them or describes them incorrectly it is more of a matter of finding it out by luck.

If you are an experienced programmer then the lack of documentation for C' Prime won't bother you. However, a new user to the Apple and to programming would be better off buying one of the implementations of Pascal. The prices are comparable and it is possible to get introductions for the new user that are specifically directed at the Apple user.

However, if you are experienced and want C then buy C' Prime. The price is right and C is definitely fascinating. ●

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media source

CADApple
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everything is much easier since all of your program, library, and help files can all reside on the same diskette. Configuring the program is limited to selecting your plotter, input device, screen resolution, locations for your help, library, and data files, and the size of your work file.

The main menu of CADApple gives you the following choices: [A] Add, [M] Modify, [G] Group, [F] Filer, [U] Units, [P] Properties, [S] Switches, [W] Window, [L] Library, [C] Construct, [H] Hatch, [N] iNquire, [I] Input, [O] Output, [K] sKetch, [E] Exit, and [?] Help. The help command is available at all levels and gives you different information for each command. Typing in a menu choice gives you a set of submenus with the separate commands.

ADD lets you add lines, rectangles, circles, text, and other elementary objects to your workfile. MODIFY lets you copy, rotate, delete, or move an object on your screen. GROUP lets you modify a set of objects at the same time. For example, you can make a separate set of objects which combine to form an automobile. With the group command you can enlarge, rotate, or otherwise modify all of the objects which make up the auto at the same time. FILER lets you save or load your drawings. Other FILER commands include the Pascal file maintenance commands, and listing directories. UNITS lets you setup the drawing size and grid size. PROPERTIES defines attributes like linestyle and level number. SWITCHES lets you control grids, hatch lines, text on the screen, and levels. WINDOW controls the zoom level on your workfile. LIBRARY controls the libraries of common objects. You can save commonly used portions of your workfile for use within other documents in a library. CONSTRUCT lets you round off corners with fillets, rounding arcs. HATCH lets you cross hatch a portion of your document to simulate shading. INQUIRE examines the characteristics of any object on the screen (e.g. line size, coordinates, width, etc.). INPUT selects your input device for coordinates (e.g. digitizer, joystick, mouse). OUTPUT lets you send you file to your plotter, or dump your present screen to a graphics printer if you have the proper hardware. SKETCH redraws the entire screen, useful if you've been moving objects around the screen or editing objects where a small object might be lost after a move. EXIT asks you if you want to save your workfile if it's been modified, and quits back to the Pascal operating system.

One extremely practical aid for using CADApple is a flowchart showing how each command is selected from each menu. Regrettably this isn't included with the package, so I designed my own (using CADApple naturally). After a couple of hours you'll get used to the most common commands and the unusual menu selection process will become second nature. CADApple does come with keyboard templates for the Apple IIe, IIc, and IIgs.

As a training tool for first time CAD users CADApple is one of the best programs available. In addition, it works adequately for architecture, engineering, flowcharting, mechanical drawings, mapping, and other small to medium CAD applications.

The diagrams with this article show three views of a house, and an engineering layout designed with CADApple.

You can't use the program for 3-D layouts, and I wouldn't recommend it for an extremely complicated sophisticated layout but for most uses CADApple is an adequate layout package. A less powerful entry level version of CADApple is available for $99, however it doesn't support the IIgs's screen or serial ports.

CADApple regrettably is an excellent program with great potential which is stuck in a rut. For the most part it's still a 1982 program, even with its support for the IIgs's screen. As long as the user has to use the mouse, or another input device, anyway to input coordinates, there's no reason why menu selections can't be displayed on the screen as well. CADApple only prints text on the screen in uppercase mode, another indication of its age. There's no good reason why it can't handle upper and lowercase text. True graphics printer support, especially for images beyond the size of the Apple's screen and for users with standard (e.g. the IIgs's built in serial ports) hardware is also a necessity if CADApple is to keep succeeding in the current software market. These suggestions are only what is necessary to make it an up to date program, with the same exact technical capabilities as the present program. To

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Ask The Guru
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(2) The older Laserwriter plus is now being discounted for as low as $1800, with the latest of third-party toner refills now being nearly as black as the newer machines.

(3) The new "laserless" NEC LC-890 PostScript printer, which your helpline callers can't seem to say enough good things about.

(4) Any of the PostScript speaking laser printers from QMS.

(5) The Hewlett-Packard Laserjet II. But beware that this turkey provides PostScript only in a very expensive and very bizarre manner that demands use of an IBM clone.

But you definitely should not buy any of these, until such time as you had some hands-on experience with them running your material your way at a local rental center, or through your local user group.

I personally own a pair of LaserWriter pluses, one with over 300,000 copies on it and now have a brand new NTX. I just can't believe I was able to squeak by so long with only two PostScript speaking printers in my home. On the other hand, the light in the pantry still is not fixed.

I guess its all in the priorities. Does anyone know an electrician that needs some typesetting done?

What Is Padding Compound?

Well, it comes in a large jar the same size and shape as the library paste you used to eat with Cecilia Winterhalter in Mrs. Lockhart's second grade art class. It costs around $7.50 a jar, and is available from Paper Plus or most any other printer supply house.

It looks sort of like Elmer's glue-all. You paint this glop onto the edge of a stack of paper, and end up with an instant notepad, fully professional prescription pads, a "while you were out" form, or even custom calendars.

While not at all a replacement for "real" binding systems, padding compound is a quick and fun way of at least temporarily holding paper stacks together. At any rate, my beginning desktop publishing students at EAC sure are getting off on the stuff.

An ordinary paintbrush works just fine, and you can clean up with water before the padding compound sets. You should carefully align and trim the pages first, and should apply some clamping pressure while the padding compound sets.

The stuff takes half an hour to dry, and two thin coats are usually better than one thick one. One jar is enough for a zillion and a half pads.

While nothing at all is needed in the way of special tools for just a few handcrafted pads, to handle the job professionally, you might want to build a padding press, which looks sort of like a Fred Flintstone style enlarger. A clamping paper cutter and a jogger are also handy production tools.

Note that many jiffy printing centers will do thick paper cutting for 50 cents a cut or so.

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Ask The Guru
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For minimum labor, it is often best to pad two opposite edges of an entire stack of full size sheets at once; you then chop these up into four or six pads as needed. By alternating stacks of paper and backing cardboard, you can work several pads thick.

Tellyawhat. For this month's contest, just dream up a new but non-obscene use for padding compound. There'll be an *Incredible Secret Money Machine* for the best twenty entries, and an all expense paid (FOB Thatcher, AZ) tinaja quest for two for the very best entry.

What Is This Month's PostScript Utility?

For years, I have been searching for a practical and economical way for hackers and engineers to do low-end printed circuit layouts.

I've been putting together a set of PostScript language printed circuit utilities that does this and a lot more. You can do 1X, 2X, and 4X layouts, frontwards or backwards, negative or positive artwork, with or without an overlay grid in ten or more layers in any size from one square inch to several acres. Very nicely, you always work "top side" and let the printer handle any trace reversals for you.

As per usual with direct PostScript, you use any old word processor on any old personal computer to do the job. AppleWriter, of course, is an especially good choice. No special graphics tools or techniques are required, and the ordinary text files can be freely passed over to most any computer.

The utilities are particularly good for such "mixed media" job tasks as an instruction book or a manual that needs

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```
-----TOOL #01 - TOOL LOCATOR -----

$0101- TLBootInit       $0A01- SetTSPtr       $1101- TLMountVolume
$0201- TLStartup        $0B01- GetFuncPtr     $1201- TLTextMountVolume
$0301- TLShutDown       $0C01- GetWAP         $1301- SaveTextState
$0401- TLVersion        $0D01- SetWAP         $1401- RestoreTextState
$0501- TLReset          $0E01- LoadTools      $1501- MessageCenter
$0601- TLStatus         $0F01- LoadOneTool
$0901- GetTSPtr         $1001- UnloadOneTool

-----TOOL #02 - MEMORY MANAGER -----

$0102- MMBootInit       $1202- PurgeHandle    $2102- HLockAll
$0202- MMStartUp        $1302- PurgeAll       $2202- Hunlock
$0302- MMShutDown       $1802- GetHandleSize  $2302- HunlockAll
$0402- MMVersion        $1902- SetHandleSize  $2402- SetPurge
$0502- MMReset          $1A02- FindHandle     $2502- SetPurgeAll
$0602- MMStatus         $1B02- FreeMem        $2802- PtrToHand
$0902- NewHandle        $1C02- MaxBlock       $2902- HandToPtr
$0A02- ReallocHandle    $1D02- TotalMem       $2A02- HandToHand
$0B02- RestoreHandle    $1E02- CheckHandle    $2B02- BlockMove
$1002- DisposeHandle    $1F02- CompactMem
$1102- DisposeAll       $2002- HLock

-----TOOL #03 - MISCALLENEOUS TOOLS -----

$0103- MTBootInit       $1103- GetVector      $1F03- ServeMouse
$0203- MTStartUp        $1203- SetHeartBeat   $2003- GetNewID
$0303- MTShutDown       $1303- DelHeartBeat   $2103- DeleteID
$0403- MTVersion        $1403- ClearHeartBeat $2203- StatusID
$0503- MTReset          $1503- SysFailMgr     $2303- InitSource
$0603- MTStatus         $1603- GetAddr        $2403- FWEntry
$0903- WriteBBRam       $1703- ReadMouse      $2503- GetTick
$0A03- ReadBRam         $1803- InitMouse      $2603- PackBytes
$0B03- WriteBBParam     $1903- SetMouse       $2703- UnPackBytes
$0C03- ReadBParam       $1A03- HomeMouse      $2803- Munger
$0D03- ReadTimeHex      $1B03- ClearMouse     $2903- GetIRQEnable
$0E03- WriteTimeHex     $1C03- ClampMouse     $2A03- SetAbsClamp
$0F03- ReadAsciiTime    $1D03- GetMouseClamp  $2B03- GetAbsClamp
$1003- SetVector        $1E03- PosMouse       $2C03- SysBeep
```

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CADApple
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become a state of the art CAD package, VersaCAD has to add 3-D modeling capabilities, import/export capabilities to other CAD programs and copies of VersaCAD on other computers, and the availability of parts libraries and sample files to help beginning users.

CADApple is an extremely versatile program with many powerful capabilities, including 250 independent drawing layers, and up to 4000 objects; however, it needs many improvements if it's to remain a leader in CAD software for Apple II computers. Hopefully VersaCAD Corporation will decide to rewrite the program to take advantage of the full capabilities of the newest Apple IIgs, hopefully also compatible with earlier Apples.

Product: CADApple 3.5 Rev. 3a. Distributor: VersaCAD Corporation, 7372 Prince Drive, Huntington Beach, CA 92647, 714-847-9960. Retail price: $395. Options: Video training tape with CADTUTOR $295; CADTUTOR teaching manual $22.95; CAD Principles and Applications book $29.95; Audio Tour (cassette) $9.95. Format: copyable 3.5" and 5.25" diskettes supplied. Hardware requirements: 128K Apple IIe, IIc, or Apple IIgs.

Supported I/O devices—Input: Joystick, Apple Mouse, a variety of digitizer tablets. Output: HP, Houston Instruments, Roland, Ioline, and Apple plotters, Grappler compatible interface card and graphics printer.

RAM cards supported as RAMdisks, hard drives compatible with Pascal 1.3 are compatible with CADApple. On enhanced Apple IIs the Videx Videoterm and Ultraterm cards can be used for two screen mode (see text for details). Warranty: 90 days.

Summary: Powerful CAD package for small to medium level applications, however, requires many improvements integrating it properly with the Apple's capabilities. ●

Ask The Guru
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"phantom" layouts for servicing or drilling guides. Best of all, the routines return "hand crafting" back to the world of printed circuit layout art.

It should even be possible to transfer toner directly to the copper PC board material for immediate etching, and thus eliminate any intermediate photo steps. Sadly, the techniques I've looked at so far "just miss" on this additional goal, but do stay tuned.

Figure 3 (page 344) shows a typical working layout. Here, viewed from the top of the board are an overlay grid, the component side traces in gray, and finally the foil side in black. As you can see, arbitrarily complex layouts are simple and easy to do.

What I would like to do here is share several of the more fundamental PostScript language PC layout codes with you. Figure 4 (page 344) is a "sampler" listing that can get you started, while Figure 5 (page 346) shows you a portion of the layout of a simple and sensitive 10-bit A/D converter that plugs directly into your Apple IIe or IIgs game paddle port. More details on the gem appear in my Hardware Hacker column over in *Radio-Electronics*.

The full blown utilities consist of three parts. A prolog contains the hundreds of available custom PostScript layout commands. A print instructions header then selects the scale, the reversals, the page position for larger printouts, and so on. Finally, your own script contains a listing of the pads and traces.

There is a limit to the total path length used in any PostScript routine. So, rather than defining a single

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-----TOOL #04 - QUICKDRAW -----

$0104- QDBootInit	$4A04- SetRect	$9204- ObscureCursor
$0204- QDStartUp	$4B04- OffsetRect	$9404- SetFont
$0304- QDShutDown	$4C04- InsetRect	$9504- GetFont
$0404- QDVersion	$4D04- SectRect	$9604- GetFontInfo
$0504- QDReset	$4E04- UnionRect	$9704- GetFontGlobals
$0604- QDStatus	$4F04- PtInRect	$9804- SetFontFlags
$0804- AddPt	$5004- Pt2Rect	$9904- GetFontFlags
$0904- GetAddress	$5104- EqualRect	$9A04- SetTextFace
$0A04- GrafOn	$5204- EmptyRect	$9B04- GetTextFace
$0B04- GrafOff	$5204- NotEmptyRect	$9C04- SetTextMode
$0C04- GetStandardSCB	$5304- FrameRect	$9D04- GetTextMode
$0D04- InitColorTable	$5404- PaintRect	$9E04- SetSpaceExtra
$0E04- SetColorTable	$5504- EraseRect	$9F04- GetSpaceExtra
$0F04- GetColorTable	$5604- InvertRect	$A004- SetForeColor
$1004- SetColorEntry	$5704- FillRect	$A104- GetForeColor
$1104- GetColorEntry	$5804- FrameOval	$A204- SetBackColor
$1204- SetSCB	$5904- PaintOval	$A304- GetBackColor
$1304- GetSCB	$5A04- EraseOval	$A404- DrawChar
$1404- SetAllSCBs	$5B04- InvertOval	$A504- DrawString
$1504- ClearScreen	$5C04- FillOval	$A604- DrawCString
$1604- SetMasterSCB	$5D04- FrameRRect	$A704- DrawText
$1704- GetMasterSCB	$5E04- PaintRRect	$A804- CharWidth
$1804- OpenPort	$5F04- EraseRRect	$A904- StringWidth
$1904- InitPort	$6004- InvertRRect	$AA04- CStringWidth
$1A04- ClosePort	$6104- FillRRect	$AB04- TextWidth
$1B04- SetPort	$6204- FrameArc	$AC04- CharBounds
$1C04- GetPort	$6304- PaintArc	$AD04- StringBounds
$1D04- SetPortLoc	$6404- EraseArc	$AE04- CStringBounds
$1E04- GetPortLoc	$6504- InvertArc	$AF04- TextBounds
$1F04- SetPortRect	$6604- FillArc	$B004- SetArcRot
$2004- GetPortRect	$6704- NewRgn	$B104- GetArcRot
$2104- SetPortSize	$6804- DisposeRgn	$B204- SetSysFont
$2204- MovePortTo	$6904- CopyRgn	$B304- GetSysFont
$2304- SetOrigin	$6A04- SetEmptyRgn	$B404- SetVisRgn
$2404- SetClip	$6B04- SetRectRgn	$B504- GetVisRgn
$2504- GetClip	$6C04- RectRgn	$B604- SetIntUse
$2604- ClipRect	$6D04- OpenRgn	$B704- OpenPicture
$2704- HidePen	$6E04- CloseRgn	$B804- PicComment
$2804- ShowPen	$6F04- OffsetRgn	$B904- ClosePicture
$2904- GetPen	$7004- InsetRgn	$BA04- DrawPicture
$2A04- SetPenState	$7104- SectRgn	$BB04- KillPicture
$2B04- GetPenState	$7204- UnionRgn	$BC04- FramePoly
$2C04- SetPenSize	$7304- DiffRgn	$BD04- PaintPoly
$2D04- GetPenSize	$7404- XorRgn	$BE04- ErasePoly
$2E04- SetPenMode	$7504- PtInRgn	$BF04- InvertPoly
$2F04- GetPenMode	$7604- RectInRgn	$C004- FillPoly
$3004- SetPenPat	$7704- EqualRgn	$C104- OpenPoly
$3104- GetPenPat	$7804- EmptyRgn	$C204- ClosePoly
$3204- SetPenMask	$7904- FrameRgn	$C304- KillPoly
$3304- GetPenMask	$7A04- PaintRgn	$C404- OffsetPoly
$3404- SetBackPat	$7B04- EraseRgn	$C504- MapPoly
$3504- GetBackPat	$7C04- InvertRgn	$C604- SetClipHandle
$3604- PenNormal	$7D04- FillRgn	$C704- GetClipHandle
$3704- SetSolidPenPat	$7E04- ScrollRect	$C804- SetVisHandle
$3804- SetSolidBackPat	$7F04- PaintPixels	$C904- GetVisHandle
$3904- SolidPattern	$8104- SubPt	$CA04- InitCursor
$3A04- MoveTo	$8204- SetPt	$CB04- SetBufDims
$3B04- Move	$8304- EqualPt	$CC04- ForceBufDims
$3C04- LineTo	$8404- LocalToGlobal	$CD04- SaveBufDims
$3D04- Line	$8504- GlobalToLocal	$CE04- RestoreBufDims
$3E04- SetPicSave	$8604- Random	$CF04- GetFGSize
$3F04- GetPicSave	$8704- SetRandSeed	$D004- SetFontID
$4004- SetRgnSave	$8804- GetPixel	$D104- GetFontID
$4104- GetRgnSave	$8904- ScalePt	$D204- SetTextSize
$4204- SetPolySave	$8A04- MapPoint	$D304- GetTextSize
$4304- GetPolySave	$8B04- MapRect	$D404- SetCharExtra
$4404- SetGrafProcs	$8C04- MapRgn	$D504- GetCharExtra
$4504- GetGrafProcs	$8D04- SetStdProcs	$D604- PPToPort
$4604- SetUserField	$8E04- SetCursor	$D704- InflateTextBuffer
$4704- GetUserField	$8F04- GetCursorAdr	$D804- GetROMFont
$4804- SetSysField	$9004- HideCursor	$D904- GetFontLore
$4904- GetSysField	$9104- ShowCursor	

Fig. 2 – Numeric Order list of IIgs tools (part 1) .

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DYNA

Ask The Guru
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seperate path for the grid, component side, foil side, and overlay callouts, these are allowed to be arbitrarily long and complex. In the complete utilities package, the print instructions header then picks either the page or the nulldevice for each layer. Anything printed to the nulldevice ends up intentionally missing on the chosen final artwork copies.

Ordinary polyester (mylar) overhead transparency material seems to work just fine for most hacker and low-end circuit layouts.

Let me know if you have any further interest in PC layout stuff.

Need Help? Phone or write your Ask The Guru questions to: Don Lancaster, Synergetics, Box 809-G, Thatcher, AZ 85552; (602) 428-4073.

Names And Numbers

Adobe Systems
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Mountain View, CA 94039

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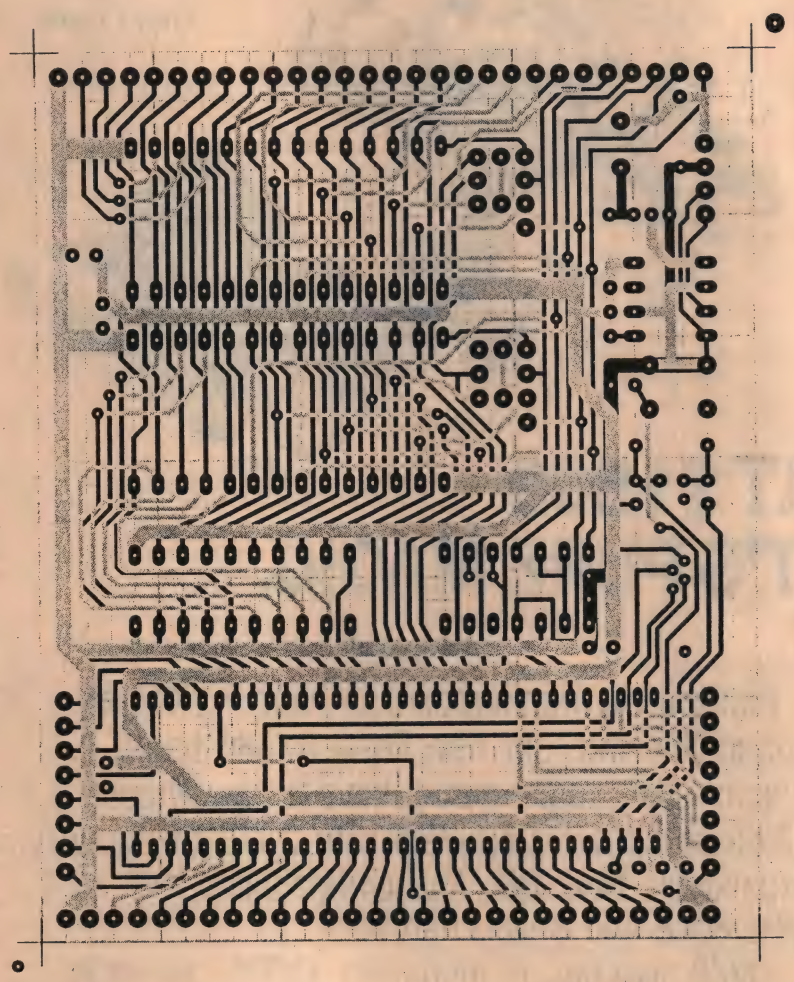

Fig. 3 – Another one of those AppleWriter text files.

```
% Copyright c 1988 by Don Lancaster & Synergetics, Box 809,
% Thatcher AZ, 85552, (602) 428-4073. All rights reserved.
% Personal, non-commercial use permitted so long as this
% header remains both present and intact.

/quadpixel {transform 4 div round 4 mul itransform} def

/setgrid {save /rubbersnap exch def /size exch def quadpixel
exch quadpixel exch translate size dup scale } def

/drawlines {72 300 div lw mul size div setlinewidth /hposs 0
def #hlines gs div 1 add cvi {hposs 0 moveto 0 #vlines rlineto
stroke /hposs hposs gs add def} repeat /vposs 0 def #vlines gs
div 1 add cvi {0 vposs moveto #hlines 0 rlineto stroke /vposs
vposs gs add def} repeat} def

/showgrid{gsave /#vlines exch def /#hlines exch def 106 45
{pop pop 0} setscreen 0.9 setgray /gs 1 def /lw 1 def drawlines
grestore} def

/2X {60 72 mul 300 div setgrid} def

/trace20 {6 30 div setlinewidth} def /trace50 {16 30 div
setlinewidth} def /trace80 {24 30 div setlinewidth} def

/am {newpath moveto} def
/tdraw {rlineto currentpoint stroke moveto} def

/u {0 exch tdraw} def /r+ {dup tdraw} def
/r {0 tdraw} def  /r- {dup neg tdraw} def
/d {0 exch neg tdraw} def /l- {neg dup tdraw} def
/l {neg 0 tdraw} def /l+ {dup neg exch tdraw} def

/black {0 setgray} def /white {1 setgray} def

/xrpt{gsave aload pop /trips exch def /dist exch def /rproc exch def
trips { gsave rproc grestore dist 0 translate } repeat grestore} def

/yrpt{gsave aload pop /trips exch def /dist exch def /rproc exch def
trips { gsave rproc grestore 0 dist translate } repeat grestore} def

/hole {gsave 150 div /dia exch def newpath dia 2 div 0 360 arc white
fill grestore} def

/icpad1v {save /psnap exch def trace50 2 copy gsave exch 0.2 sub
exch am 0.4 r grestore 20 hole psnap restore} def

/edgeconu {gsave translate 0.4 0 moveto 0 -2 0.4 0 180 arcn 0 2
rlineto closepath fill grestore} def

/feedpad {save /fpsnap exch def newpath 2 copy black 0.25 0 360
arc fill 18 hole clear fpsnap restore } def

/circpad2 {save /fpsnap exch def newpath 2 copy black 0.30 0 360
arc fill 22 hole clear fpsnap restore } def
/dip8v{gsave translate [{0 0 icpad1v} 1 4] yrpt [{3 0 icpad1v} 1 4]
yrpt grestore}  def

/dip16v{gsave translate [{0 0 icpad1v} 1 8] yrpt [{3 0 icpad1v} 1 8]
yrpt grestore}  def

1 setlinejoin 1 setlinecap
```

Fig. 4 – A sampler of my Postscript printed circuit routines.

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Paintworks Gold

Reviewed by Philip Chien

The first IIgs paint program was Actavision's Paintworks Plus, a MacPaint look-a-like with the addition of 16 user selectable colors. Deluxe Paint II, from Electronic Arts, followed with the exotic special effects including 3-D perspectives and dual screens among other enhancements. Actavision has decided to up the ante with its latest release-Paintworks Gold, with special effects including 3-D effects, color mixing, dual editing screens, four zoom levels, search for color, variable size grids, and smoothing tools. All together Actavision lists 80 separate improvements in Paintworks Gold over Paintworks Plus.

Paintworks Gold, like its predecessors, is a bit-oriented graphics program. With a bit-mapped graphics program (as opposed to an object oriented graphics program) you are performing the equivalent of drawing on a page with a pencil (or paintbrush for wider strokes) and erasing blocks of the page with an eraser. In fact the tool icons even look like a pencil, paintbrush, eraser, spray paint can, and so on! A new icon "cotton" lets you dab in portions of color, as if you were using a swab of cotton dipped in paint. The major disadvantage to a bit-mapped graphics program is that once something is placed on the page it stays there. You can eliminate mistakes by erasing them or painting over them, however, it's very difficult to move or rearrange something on a page. With object oriented graphics programs it's easy to group objects together and move them around the page as needed. In addition, object oriented graphics can be scaled (reduced or enlarged) without any loss of resolution. The advantage of a paint program is you can create anything you want, you aren't limited to the lines and drawing icons used by object oriented programs. If you want to produce photograph-like pictures, paintings, or other "real-life" images then a bit-mapped graphics program, like Paintworks Gold, is the only way to go. Object and bit oriented graphics programs both have their advantages and purposes (in fact Actavision carries both types. Draw Plus is their object oriented program) and many users find it convienent to own both types.

Most bit-oriented programs, including Paintworks Gold, try to get around the bit-map limitations with the addition of fancy special effects functions. You can cut out a piece of graphics, merge graphics from different programs, and with the more advanced programs change the size of a selected portion, or modify it with special effects commands.

If you're used to using Paintworks Plus, or any other IIgs paint package, you'll have to get used to the new commands used with Paintworks Gold. For example, to change the shape of your paintbrush you have to double-click the paintbrush icon instead of selecting "brush shape" from the Goodies menu. To change the size of something you select it with the marque box and choose Resize instead of streching the marque box. The zoom function icons is a set of four different size dots in the tool box. Pressing each of the dots selects a different zoom scale. One unique zoom feature in Paintworks Gold is the capability to select different backgrounds in the zoom modes. Besides a plain zoom you can select a checkerboard-like border around each of the bits with either a dark or light border. It takes a little to get used to the new methods of accessing commands, but fortunately almost all of the major commands have keyboard equivalents in addition to their mouse counterparts. The online help is a good feature if you've forgotten how to access a particular command, however, the help screens are no substitute for the 146 page instruction manual. The manual could have had a better arrangement though, and I would have

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Paintworks Gold
continued from page 345

liked a chart showing all of the keyboard equivalents.

There are several bugs in the program though. Inconveniently the default location for the mouse coordinate info window is the same as the fatbits zoom window. While each of the windows can be moved it would be much nicer if the windows defaulted to different locations. In addition it would be nice if the program saved the locations of the windows and tools along with your pictures. Another more serious bug involves the zoom window (fatbits mode). As documented in the manual you can draw in the zoom window and it will modify the picture in the normal magnification mode. However, I found out that if you are dragging the mouse across the zoom section and the window then you will also edit the text underneath the zoom window which you can't see. You won't find out about your mistake until you shut off the zoom window! This isn't a fatal error though, and it only occurs under specific circumstances so it's easy to avoid. Another annoyance is the marque box will only select a rectangular box, as opposed to cutting only an image while ignoring the background. While it's possible to select only an image by using the lasso function, the lasso is somewhat more difficult to use and it would be much easier if Paintworks Gold had an option to let the marque select an image without the background.

Contrary to Actavision's claims, Paintworks Gold isn't compatible with all of the IIgs' paint formats. When you load a file Paintworks Gold checks the filetype and automatically loads and uncompresses it into the IIgs' memory. When you save a graphics screen you can choose any of three different file formats: Paintwork's own paint format (ProDOS type $C0. subtype $0000), the Apple preferred format (ProDOS type $C0, subtype $0002), and a BSAVE screen format (ProDOS type $C1, subtype $0000), however, these aren't all of the Apple graphics formats. Besides earlier Apple II graphics formats (e.g. LORES, HIRES, DoubleHIRES) which still exist on the IIgs, Paintworks Gold won't load Deluxe Paint II pictures properly. If there is an update to the program, and the company does decide to support more graphic formats, then I'd appreciate it if the program could also support TIFF (Tagged Interchange File Format), the format used by major desktop publishing packages and scanners. With TIFF capabilities it would also be possible to generate a picture on the IIgs for eventual use on another TIFF compatible computer, an IBM or Macintosh for example.

Paintworks Gold works in both the IIgs's 320x200 16 color and 640x200 4 color mode. In the later mode ditherized mixed colors are used to stimulate 16 colors for finer details. In either case single screen pictures or 320x396 full page (two screen) graphics can be generated. The full page graphics modes are dumped to the ImageWriter in its 72 DPI mode where every pixel on the screen is printed as a four pixel square on the printout. A vertical condensed mode is also available which uses two dots per pixel. With the LaserWriter you have the capability to shrink and expand images. A true 300 DPI graphic can be dumped on a LaserWriter by shrinking the image, however, you'll have to shrink a full page screen to less than two square inches in size for that resolution! Regrettably Paintworks Gold has chosen to limit itself to 320x396 dots simply because this is the "standard" which has existed for the Macintosh, and the IIgs. It would have been quite possible for the programmers to design Paintworks Gold with variable user selectable resolutions up to 612x792 pixels, an entire page (8.5"x11") of graphics at 72 DPI. Hopefully this will become available in the future, if not with Paintworks Gold then with another program.

The Paintworks Gold program diskette aside, I was extremely annoyed with the pictures included in Actavision's clip art disks. The original Paintworks clip art diskette mixed pictures of UFOs, flying saucers, and Sci-fi robots along with pictures of actual spacecraft in the category "Outer Space." While it did include an adequate drawing of a space shuttle, it was rather insulting seeing it next to a bug-eyed space alien. Another category, "Fantasy," included actual beings, like dinosaurs, mixed with devils, demons, and assorted other halloween creations. Would it have been that much more difficult for the artists to place the dinosaurs in a seperate folder named "Dinosaurs," and include the space aliens in the fantasy category? Apparently the editor at Actavision thought that it wasn't worth the extra effort. The new clip art disk supplied with Paintworks Gold is just as biased, and unfortunately also extremely sexist and racist in its images. With rare exceptions almost all of the humans shown in various work and play environments are white males. Women are rarely shown, and when they are used they're shown in secondary roles, like a secretary working for a boss. Diagram 1 is the clip art file "People."

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Ask The Guru
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See LaserWriter Corner page 352

% requires printed circuit sampler code of figure four

```
100 100 2X 11 11 showgrid trace20 10 2 am 1 l 0.75 l- 4.5 l 0.75 l+
2 l 6 u 10 5 am 0.75 l 1.5 l- 1.25 l 0.5 l- 2 l 0.5 l+ 0.75 u 1.25 l+ 7 4 am
0.75 l  0.5 l- 0.75 l 5 5.5 am 1 l+ 1.5 u 5 4.5 am 2 l+ 2 u 2 6.5 am 1.5
u 7 3 am 0.5 l- 2.75 l 0.75 l+ 0.5 u 0.75 l+ 2 3.5 am 1 l 10 9 am 0.75 l+
2.75 l 0.5 l- 2.75 d 1 l 6 6.5 am 2.15 d 0.35 l- 1.15 l 2 l+ 1 l 5 6.5 am
1.5 u 7 2 dip16v 2 3.5 dip8v [{1 10 edgeconu} 1 5] xrpt 3 2 circpad2
4 2 circpad2 3 5.5 feedpad showpage
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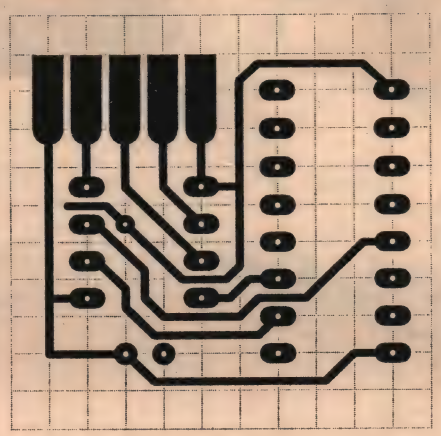

Fig. 5 – A simple printed circuit layout example.

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Hyperspectives
continued from page 197

in your own stacks. Includes arrows, hands, pointers, magnifiers, etc.

DIAL BUTTON, by Gary White. A custom "detent knob" button that can be clicked to any of 12 positions. Very handy for inputting an incremental variable.

DISPPICT 1.4, by David Fry. An XCMD that allows you to view MacPaint and PICT files directly from Hypercard. Will display color or gray scale pictures on a Mac II.

DRAGRECT, by Richard Davis. AN XFCN that allows you to create a movable, scrollable window from within Hypercard. Now Hypercard can do windows!

GET/SET VOLUME, by Steve Kienle. An XFCN and XCMD that allow you to find out the current speaker volume setting as well as reset the volume from directly within a Hypertalk script.

HYPERFONT, by John Anderson. A stack containing a customized version of the Times 14 font, designed especially for Hypercard. In addition to normal text, allows italics, left- and right-hand quotes, and a set of unique "tagsterisks" from within any single text field.

ICON BUTTONS, by Mark Spaulding. Allows you to simply and easily create buttons that directly launch external applications.

INKEY, by Guy de Picciotto. An XFCN that allows you to trap for any key typed on the keyboard. Handy for reading input and locking out unwanted keypresses.

LOCK AND SCROLL, by John Anderson. A framework for an interlinked glossary function. Key word

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Paintworks Gold
continued from page 346

The only minorities shown here are an American Indian in full costume, a Hawaiian hula dancer, and an African tribeswoman. Women are shown as arguing, playing with dolls, or shopping for groceries. The Paintworks Gold manual gives credit, or more accurately blame, for the clip art gallery to Hilary Mills and Muffy McCosh. While there are certainly some people who will consider the Clip art diskettes to be representative of their own life styles, I found them extremely offensive, and not the type of images which I would want to show, or include within my drawings.

If you already own Paintworks Plus, Actavision will upgrade your program to Paintworks Gold for $23.50 through May 31, 1988. If you own any other IIgs paint program, or miss the May 31st deadline, you can get Paintworks Gold for $43.50. You should send payment and page one from your program's manual to: "Paintworks Upgrade," Actavision, Inc., P.O. Box T, Gilroy, CA 95021-2249. Naturally California residents should add 6.5% sales tax. So far no word as to whether or not you qualify for the upgrade program if you already used page one of your manual for a different upgrade offer from another manufacturer. One other important note if you plan to contact Actavision, they're moving to new offices, (see end of article for address and phone numbers.)

Paintworks Gold is certainly a powerful, relatively easy to use paint program, however, it does need several changes. Most importantly the clip art diskettes must be revised to make the artwork and arrangement less offensive to the general public, rather than oriented towards any specific audience. The Paintworks Gold program could use several improvements, including higher density graphics, high density support for the ImageWriter LQ, and support for more IIgs graphics formats. Hopefully these changes will be seen in future releases.

Product: Paintworks Gold, Authors: Luc Barthelet and Henri Lamiraux, Version Soft Inc., Distributer: Actavision, Inc., 3885 Bohannon Drive, Menlo Park, CA 94025. (415) 329-0800, Retail Price: $99.95, Format: copyable 3.5"diskettes. Hardware requirements: Apple IIgs with at least 512K RAM. ImageWriter, Epson, and LaserWriter supported. Warranty: 90 days diskette replacement.

Summary: Fairly powerful IIgs paint program, although it does have some bugs. Clip art disks certinly deserve an editor with some taste and tact though. ●

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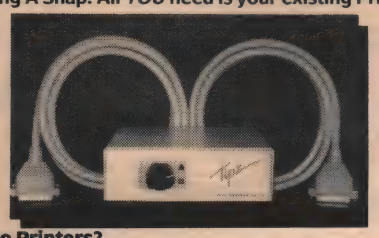

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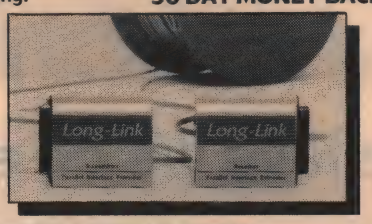

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Peter Byer, vice president of marketing at DMA, had this to say about the new capabilities PC MACTerm confers on pcANYWHERE III—DMA's extremely successful PC-PC remote computing product: "Now, not only does pcANYWHERE III erase distances it also erases differences—between the Macintosh and the PC.

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Hyperspectives continued from page 348

and its definition are interlocked, in linked scrolling fields. Get directly to specific word with keyboard input, by scrolling, or by clicking on "live" text.

MAKE ICON, by George Coyne. An XCMD which enables the user to create ICON type resources in the "fat bits" mode, and then install them in HyperCard stacks. Very handy.

MULTIPLE SCROLLING FIELDS, by Mark Safire. Enables you to control several fields with one scroll bar. Contains a special feature that aligns the top of the first line with the top of the field, so lines are never truncated.

POPALERT XFCN, by Eduardo Mendez. Allows "true" alert boxes that contain a descriptive icon from Hypercard stacks. Excellent in obtaining a more "Maclike" look for your stacks.

SOUND CONVERTOR 1.0, by Paul Beaumont. Takes a SoundCap file, converts it to a SND resource (playable through Hypercard), and then imports it to the stack of your choice. Saves time and effort.

UNIVERSAL TEXT BUTTONS 1.4, by Guy Kuo. Two alternative methods for making "sticky" text buttons in any field, locked or unlocked.

ZOOMRECT, by Richard Davis. An XCMD which animates "zoom" rectangles that can be specifically targeted to any size and location on the screen. Much more powerful than the default zoom visual effect.

Check an online service or bulletin board near you for these utilities. Alternatively, all of these stacks are all available on a single disk for $15. Be sure to ask for Hyperware Utilities Disk Volume 2. Make check or money order payable to the Acme Dot Company, P.O. Box 5923, Titusville, FL 32783.

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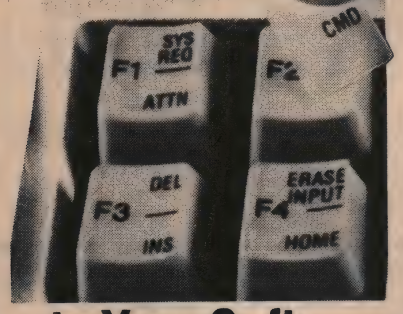

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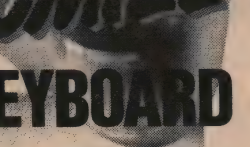

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AST Announces Revised Release Dates For Mac86

AST Research Inc. has announced revised release schedules for its Mac86 product, and for updated software for its Mac286 product. The company now expects to begin shipping the Mac86 during the third calendar quarter of 1988. Update software for the Mac286 will be released in two stages: one expected in May, and a second early in the third quarter.

The Mac86 and Mac286 are coprocessors for the Apple Macintosh SE and Macintosh II, respectively, that allow users to run MSDOS applications in a window on their Macintosh as they would on an IBM-PC or compatible. Both products are the result of joint development by AST, Phoenix Technologies, Ltd., and Apple Computer, Inc.

David Troup, product marketing specialist for both products at AST, indicated that the delays were the result of a combination of factors. "We want to ensure that both products deliver the best performance possible, and we've added new features not included in the original design. We've also spent a lot of time enhancing the Mac286 software, to deliver screen performance that more closely approximates that of a real PC-AT." The final products will also be compatible with and take full advantage of the current release of Apple's MultiFinder.

Smooth integration of the MSDOS functions into the Macintosh environment has required more than expected time and expertise, according to Lance Hansche, president of Phoenix Technologies, Ltd., responsible for much of the coprocessors' development. "We underestimated the complexity of designing such a seamless interface around the Mac86. The end result, though, is a product which allows DOS and Macintosh applications to coexist and exchange information in a way that feels comfortable to both the DOS and Macintosh user."

Although the delays have been frustrating to everyone concerned, all three development partners remain enthusiastic about the viability of the Mac86. "We feel that as the market for the Macintosh SE matures, the need to coexist with the MSDOS environment will grow," said Charles Oppenheimer, Macintosh group product manager at Apple. "The Mac86 represents an elegant means of providing that functionality in a way that is consistent with our expectations for Macintosh applications."

Troup indicated that both updates of the Mac286 software would be provided without charge to all current Mac286 owners, and that it would automatically be sent to all customers whose warranty registration cards have been returned to AST.

Virtually any application compatible with a PC-XT can be run on a Macintosh SE with a Mac86 card installed, at speeds comparable to a PC-XT. The Mac286 provides a similar degree of compatibility, and provides performance comparable to an 8MHz IBM PC AT.

AST Research Inc. is a leading manufacturer of products that provide high performance desktop computer solutions including the highly acclaimed Premium/286, the 20MHz Premium/386, a complete line of workstations, and an industry-standard TurboLaser printer with PostScript. AST's industry leading board-level product lines feature advanced technology enhancements that connect, expand and customize the capabilities of IBM XT, AT and PS/2 desktop computers.

For more information contact AST Research, Inc., 2121 Alton Ave., Irvine, CA 92714. ●

PC MACTerm continued from page 349

"There isn't anything quite like it on the market," said Mr. Byer. "For the first time, Macintosh users can find complete compatibility with PC hardware and software, without purchasing anything additional."

Macintosh Users Can Now Access A Variety Of Mainframes

Companies with a PC connected to a mainframe can now run mainframe programs from a Macintosh; PC MACTerm runs on the Macintosh; pcANYWHERE III runs on the PC; the PC is connected to the mainframe.

"In effect," Mr. Byer says, "you run mainframe programs from the Macintosh. Previously, Macintosh to mainframe direct connections have been limited. PC MACTerm plus pcANYWHERE III has just changed all that."

The Best Of Both Worlds

Mr. Byer called up the increasingly familiar scenario of a user with a Mac at home and a PC in the office. He then made reference to the great number of businesses nationwide with AppleTalk networks that can use pcANYWHERE III plus PC MACTerm to provide IBM hardware and software compatibility to an entire network of Macintosh users.

"It's really the best of both worlds," said Mr. Byer. "Not only can previously unavailable DOS programs now be run on a Mac, but they are enhanced by the Mac user interface. The result is that DOS programs are easier to use through the Macintosh than they are on a PC."

These are some of the enhancements PC MACTerm adds to DOS programs:

1) Use the Macintosh cut and paste functions to copy data from one DOS program to another, or from a DOS program to a Mac program.

2) Move the PC cursor using the Macintosh mouse, and press function keys without ever having to touch the keyboard.

3) Use Macintosh's MultiFinder to run Macintosh programs simultaneously with a PC program.

More Comprehensive And Less Expensive

pcANYWHERE III plus PC MACTerm offers a more comprehensive and less expensive solution than other Mac-PC connections:

1) The current hardware approach (an IBM computer on a card) requires a card for each Mac (at the cost of $700-$1000 each) making this alternative much more expensive. This approach is also less complete, since, unlike pcANYWHERE III plus PC MACTerm, it does not provide any access to IBM hardware, e.g., IRMA and Wang attach cards.

2) A current software approach (a DOS emulator) requires upwards of 2½ MB RAM, plus one copy of the software per machine. This approach is less complete, since vast CPU overhead limits the connection to the MAC II only. pcANYWHERE III plus PC MACTerm has no such restriction.

Running On An AppleTalk Network

Currently, the pcANYWHERE III plus PC MACTerm connection to the AppleTalk network is made using Shiva Corporation's NetSerial or NetModem, which are available from DMA. Later this year, DMA will be releasing a version of PC MACTerm that will work through AppleTalk PC, TOPS, or Tangents network card.

About pcANYWHERE

pcANYWHERE III is DMA's award-winning remote computing software package designed to let any PC, terminal, non-IBM-compatible with terminal emulation, and now, Macintosh run any IBM PC, XT, AT or compatible from any remote location via modem or direct RS232 cable connection. The PC-to-PC connection lets you run remotely all programs and peripherals, including internal cards, such as IRMA cards.

pcANYWHERE III also enables remote access to LANs. You can call into a LAN from anywhere, and, once again, run LAN programs and attached peripherals. Novell uses pcANYWHRE on its Asynchronous Communications Server.

The program has extensive security capabilities, and allows for complete bi-directional file transfer. Unlike competitive remote computing packages, one purchase of pcANYWHERE III provides the software necessary for both sides—host and remote—of a PC-to-PC remote connection.

pcANYWHERE III works with high speed modems as fast as 19,200 baud, has a built-in automatic dial directory, automatic callback capability, voice/data switching which allows users to move back and forth between data and voice transmission on the same line, and many other unique features that set the program apart.

pcANYWHERE III retails at $145 and PC MACTerm retails at $99. Dealer and volume discounts are available. Contact Dynamic Microprocessor Associates at (212) 687-7115, or write DMA, 60 East 42nd Street, New York, NY 10165. ●

IBM COMPATIBLE PERIPHERAL CARDS

EVEREX MAXI-MAGIC RAMCARD

This clever little EVEREX card conforms to the Lotus/Intel EMS format for RAM expansion, and is far cheaper than they are(and is just as good). It takes up to 2 Meg of 256K DRAMS and comes with all needed diak/spooler software and a good English manual. $129.95

PROGRAMMERS

A great new system for EPROM programming, a table top unit holds the ZIF lever action sockets for holding the EPROMS and is connected to a bus resident programmer card that uses masterfully written software to quickly program nearly all EPROMS.(2716 to 27512, 12.5v to 24v) The full screen editor allows you to:

* READ to RAM area
* WRITE to EPROM from RAM area
* WRITE to nameable disc file from RAM area
* EDIT the RAM area to change bit by bit
* BLANK? test for blank EPROM
* VERIFY? verify that programmed EPROM is correct
* COMPARE two EPROMS, and list differences(if any)
* COMBINE, put 2 or more small EPROMS into a larger
* DIVIDE, Break a large EPROM into smaller ones
* HEX and Intel/Hex formats

This nice unit comes in three formats for most users.
(A) EW901 single socket for one at a time $99.95
(B) EW904 4 sockets for small volume output $189.95
(C) EW910 10 sockets to really crank'em out $249.95
The units are all fully powered from the PC/XT/AT host, and can operate with the LID-DOWN

874X PROGRAMMER

874X Refers to the INTEL group of CPU's with EPROMS built in for single chip uses. Handles the 8741,8742,8748,8749 and lets you:

* READ to RAM area
* EDIT RAM area bit by bit
* WRITE nameable RAM area to disc file
* WRITE RAM area to 874X
* COPY, quick copy/verify mode
* BLANK, checks for blank EPROM area

This unit gets it's power from the host PC/XT/AT and runs in LID-DOWN mode for ease of use. $199.95

PAL PROGRAMMER

OF PAL-O-MINE. A PAL programmer that plugs into the PC/XT/AT host with a desk top ZIF socket for programming most common PALS(MMI, NS, TI 20PIN styles 10xx,14xx,16xx, 24PIN styles 12xx,14xx,16xx,18xx,20xx) Full screen editor allows you to:

* READ PAL into RAM area(if privacy fuse intact)
* EDIT RAM area(change bit by bit)
* WRITE to nameable disc file from RAM area
* WRITE to PAL from RAM area
* COPY fast copy mode
* FUSE CHECK, sees if fuse intact or blown
* FUSE BLOW, blows privacy fuse so no-one can copy

This units gets it's power from the host, and runs with the LID DOWN. $269.95

SINGLE CARD SYSTEM????

What is a single card system??? It is a system that uses up only one slot for the following functions:

* Monochrome graphics adapter(Hercules comp)
* Parallel printer port
* Serial port
* Game port
* Clock/calendar
* Drive controller(dual floppy)

As you can see it is quite efficient. The use of LSI circuitry cuts the power used to about 35% of the power used by the 3-4 cards it replaces, and it frees up 2-3 extra slots for those slot hungry fiends among you for only $99.95

New Mono-Printer

A short LSI implementation of the popular Hercules mono graphics adapter. 100% Hercules compatible $49.95

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A short LSI implementation of the IBM color graphics adapter with the added feature of a 100% hercules compatible printer port added in $49.95

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MULTI I/O CARD

The multi I/O card lets you run two drives, serial, parallel,clock,calendar, game ports all on one card. A very efficient card for system compaction. $79.95

PRINTER CARD

The std Centronics printer card $24.95

RS-232 CARD

RS-232 Serial card $34.95
Second port installed $14.95

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Excellent value, has a serial card and a clock/calendar card on one board. $44.95

GAME CARD

$24.95

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1 port drive card (2 drives) $24.95

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2 port drive card (2 internal. 2 external)$34.95

I/O + 2 CARD

I/O+2 clone, Serial/Par/clock/cal/game $59.95

576K RAM CARD

576K RAM card, allows up to 576K to be added to a PC or other system, addressable. $49.95

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GENDER CHANGERS

Many a poor maid has wished to find a gender changer in time of need. They solve the problems you meet when you must mate a cable to a peripheral device and you end up with two males or two females meeting. Now there ain't no gay machines so you cannot make the connection unless you change the gender of one of the ends. Enter the gender changer, just plug it into one connector and you can then make the connection. Obviously you need both M-M and F-F types and DB9,15,25,37 and Centronics to be fully prepared for all problems. They are cheap enough that you can buy a few for your service kit or the bench. They are a real life saver when you are stuck as it saves you from laboriously soldering up an adapter out of small parts and that costs you a lot more in time and parts than we sell the changers for.

DB9 MM	$4.95	DB9 FF	$4.95
DB15MM	$5.95	DB15FF	$5.95
DB25MM	$6.95	DB25FF	$6.95
DB37MM	$9.95	DB37FF	$9.95
Cen36MM	$9.95	Cen36FF	$9.95

RS-232 BREAKOUT box, lets you jumper all the RS-232 lines every which way $9.95

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PROTOTYPE CARDS

PROTOTYPE BOARDS for the XT, AT,models 30 up.
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BOCARAM AT RAM card, up to 2 Meg RAM(4 with piggy-back card). Advanced circuitry allows use as EMS,EEMS, or Std RAM. for almost any uses. OK $159.95

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MAGNAVOX

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An uninterruptible power supply(also called a BATTERY BACK-UP power supply) can save you lots of time and aggravation by letting you save your files etc when the power fails. The times listed are for an average system with monochrome TTL monitor, hard drive and 2 floppies. The time can be extended by turning off the monitor after save procedure is under way, and you do not need to see any screen data.
Thesegreat new UPS from SENDON are extremely reliable units. We have had a very low failure rate and we recommend them without hesitation. They have a 1 year warranty, full EMI and RFI filtering and surge suppression built in and have visual and audible power loss warnings. The efficiency is nearly 85% and the transfer time is under 30 MS. The units all have multiple outlet sockets and internal gel cell batteries for safety from spills.

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UPS-250	36 Min	31 Min	2
UPS-400	53 Min	50 Min	4

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* 1 year warranty * EMI, RFI filters * Surge protection circuits * High efficiency * Internal GEL-CELL * Audible power loss warning * Fast transfer time * Multiple output sockets

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THE SMART ONE 1200/300 Modem, very new unit, small in size and big in performance.100% Hayes $84.95

THE SMART ONE 2400/1200/300 Modem, high quality fast modem to save long distance charges, and let you get all you can within your time limit, 100% Hayes $149.95

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Original IBM quality $129.95

The ASTEC 200W AT power supply is the original one inside real IBM AT systems. they have less than 0.1% failure rate. If you are making a critical system get one of these. The Clone AT power supplies you see selling for a lot less are real junk with up to 50% failure rate, and it does you no good to get another bad unit.(many Taiwan clone AT power supplies have no +12V protection and regularly FRY hard drives. Ask a few friends and see.

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At last the keyboard many of you have been waiting for! This is an ultra high quality keyboard manufactured by Microswitch with true mechanical switches. The closest you will find to TRUE BLUE! We only have a limited number of these and they will go fast at $49.95. (Note these are for XT only, can be substituted in the XT kit for the RT-101.)

BEAVER 286 12Mhz AT MOTHERBOARD

BEAVER 12Mhz AT,1 Ws 0K $389.95
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ZYMOS BABY AT MOTHERBOARD 10Mhz $389.95

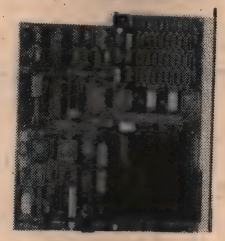
Diamond Flower Inc is one of the most knowledgeable computer manufacturers in Taiwan. It's products are first class stuff, 100% reliable and well engineered. This BABY AT motherboard has all the features of a full sized IBM motherboard, and a few more. The options are all well documented and placed on the board in the most useable places for quick and easy assembly. The ZYMOS chipset uses only a fraction of the power of a full sized AT, allowing for cooler , longer lasting systems.

Some features are:

* Turbo LED output
* External battery con
* Frequency output
* Hardswitch speed
* 6 16 Bit Slots(AT)
* 1 Meg DRAM
* Hardware RESET
* Keylock feature
* Zero wait state, 10 Mhz
* softswitch speed
* 2 8 bit slots(XT)
* Fits XT space

When you order the BABY AT motherboard you can choose the full sized or BABY AT case, as the BABY will fit both.

ATTAK-286 AT COMPATIBLE BOARD



Yes we still sell the ATTAK-286 motherboards. One of the finest AT compatible motherboards made in the USA. It has all the great ATTAK features such as:

* 8 or 10 Mhz versions
* On board battery
* Runs Std AT peripherals
* 6 16 Bit slots AT
* 1 Meg RAM space
* 80287 option socket
* With latest Phoenix BIOS
* Chips & Technology LSI set
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(D) BARE PCB only $89.95
(E) Phoenix BIOS for AT $59.95
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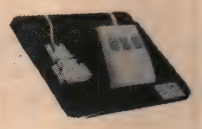
LOGITECH MICE



Compatible with all mouse based software. Opto-Mechanical. • No power supply required • High resolution • 3 button design

Who knows most about MICE???, LOGITECH that's who. Mice are mechanical, and mechanical means moving parts, and that means wear and tear and the need for good design and materials. LOGITECH has all of these, so all LOGITECH mice work, and keep on working.But the cheap TAIWAN mice all suffer from bad design and materials on the inside(where it don't show), and after a few days or weeks they start to act jerky, and soon stop working, and the "Money back if not satisfactory" warranty will not help you because you find that your money was 100% satisfactory, and all you can get are more lousy mice to stave you off until your warranty is dead and gone, along with your money. Then you get a real mouse from LOGITECH and you are happy for life.

LOGITECH C-7 SERIAL MOUSE	$74.95
LOGITECH BUS MOUSE	$64.95
C-7 MOUSE with LOGIPAINT	$119.95
C-7 MOUSE with LOGICAD(Genericad 2.0)	$119.95
C-7 MOUSE with PUBLISHER	$129.95

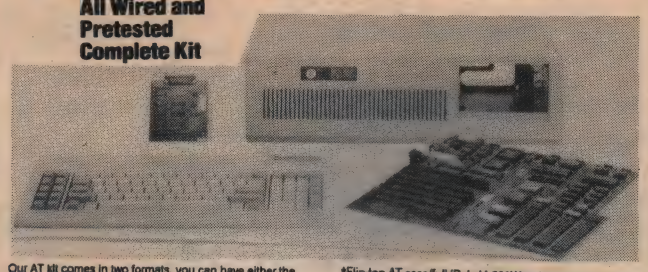
Add $10 for BUS MOUSE with packaged software.

NEW NEW a high resolution mouse for CAD uses. This little gem has 320 DPI(Dots per Inch) for real sharp work on drawings etc, and it does not cost much more for the great new resolution it gives you. $139.95

Easy to Build • All Wired • Pre-Tested Kit

AT SYSTEM KIT $999.95 1 YEAR WARRANTY

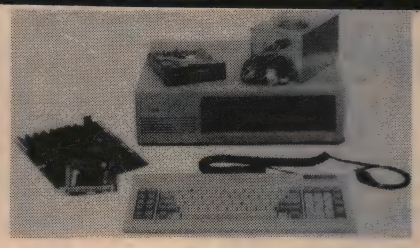
All Wired and Pretested Complete Kit



Our AT kit comes in two formats, you can have either the ATTAK-286 motherboard or the BEAVER 286 motherboard as the basis of the system. All other thing remain the same. Bear in mind that you may have to buy more expensive cards that will run at the higher speeds(10 or 12Mhz) and so the higher speed may have higher costs than you realize. Also the higher speeds may make some programs run too fast for you to use(mainly games, where you get caught by the monster, or burned by the space ships instantly before can think or move)
The systems are as follows:

Flip-top AT case(full/Baby) 200Watt ASTEC Pwr Sply
* RT-101 KB(Keytronic) * Floppy/hard controller
* 1.2M DS4D FDD * 256K DRAM
* Phoenix/AWARD BIOS * Full or BABY AT motherboard

Please choose the motherboard you wish from these:
(A) 8 or 10 Mhz ATTAK-286 motherboard(Chips & Tech)
(B) 12 Mhz Beaver=286 Motherboard (ZYMOS)
(C) 10Mhz BABY at from DFI Inc(ZYMOS)
The salient features of these motherboards are listed on this page.



XT TURBO KITS

COMPLETE 8MHZ XT TURBO KIT $499.95

We make up the XT kits from stocks of fully tested cards, cases, power supplies drives etc so that all you need do is follow the easy instructions to put your kit into operation in a hour or less. The XT Turbo kit comes with the following

* 150W Power supply
* 8Mhz Turbo XT MB
* Drive ports
* 1 DSDD drive
* Flip-Top case
* Speaker
* RT-101 Keyboard(KEY-TRONIC
* 256K DRAM
* Drive cables
* Video card(CGA or MGA)
* Printer port
* AmberMonitor

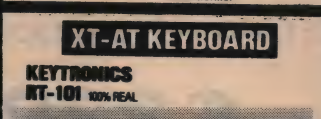
All for only $499.95, ready to assemble
Optional full feature extras. For only $199.95 you get the following:

* Extra 384K DRAM
* Clock/Cal/Serial/Game & Parallel ports
* Extra DSDD floppy
* 10 disks FEEWARE

Total price $699.90 for full package. Note this gives you good quality stuff, not the cheap junk sold by some fly-by nighters.

XT-AT KEYBOARD

KEYTRONICS KT-101 100% REAL



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XT FLIP-TOP CASES $59.95

The XT Flip-top case is std XT size with heavy steel construction making it very rigid. There are also reset and turbo switches on the front and a keylock for KB data. With speaker harness, and all the small parts needed.

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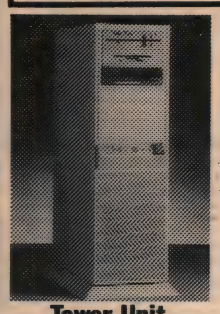

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LASERWRITER

LaserWriter Corner

by Don Lancaster

Do NOT attempt to use freon or other chemical sprays to clean your Laserwriter! Freon converts toner into a conductive and nearly indestructable varnish. Some of the electrical cleaners, especially the Lectra-Motive #05018, can actually dissolve your Laserwriter. Use a solder sucker or a vacuum cleaner instead.

• • •

Here's how to get up to date on bar codes. The UPC council has the standards, the AIM is a trade group, while the two others that follow are free trade journals . . .

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Chicago, IL 60614
(312) 528-6600

Automatic ID News
7500 Old Oak Blvd
Cleveland OH 44130
(216) 243-8100

UPC Council
7075 Corporate Way S-106
Dayton, OH 45459
(513) 435-3870

• • •

A good imagewriter emulator is available over on the Apple IIgs system master disk under /SYSTEM.MASTER/APPLETALK/IWEM. This is a standard text file that may easily moved to most any computer system. To activate the emulator on any job, start with the PostScript command "_WBJ_". You can easily modify IWEM to handle just about any emulation.

• • •

MATERIAL OF THE MONTH —

BADGE-A-MINIT is a complete source of badgemaking tools and supplies that can go as low as eleven cents per badge. From Badge-A-Minit, 348 North 30th Road, Box 800 LaSalle, IL 61301 (815) 224-2090

PUBLICATION OF THE MONTH —

ELECTRONIC PUBLISHING is a free trade journal that has good information on papers, toners, and lots of small quantity desktop publishing tools. They also have a fine yearly supplier directory. From Electronic Publishing, 401 North Broad Street, Philadelphia, PA 19108 (215) 238-5300.

• • •

FREE FONT

The quality of very small text can be dramatically improved by using the following routine. You can now print legible text as small as 3 points on a 300 DPI printer . . .

```
/currentchar ( ) def
/fineprint {{currentchar exch 0 exch put currentpoint
dtransform exch ceiling exch idtransform moveto
currentchar show currentchar ( ) eq {currentpoint exch
spacekern add exch moveto} {currentpoint exch charkern
add exch moveto} ifelse} forall} def

% demo - remove before use ...

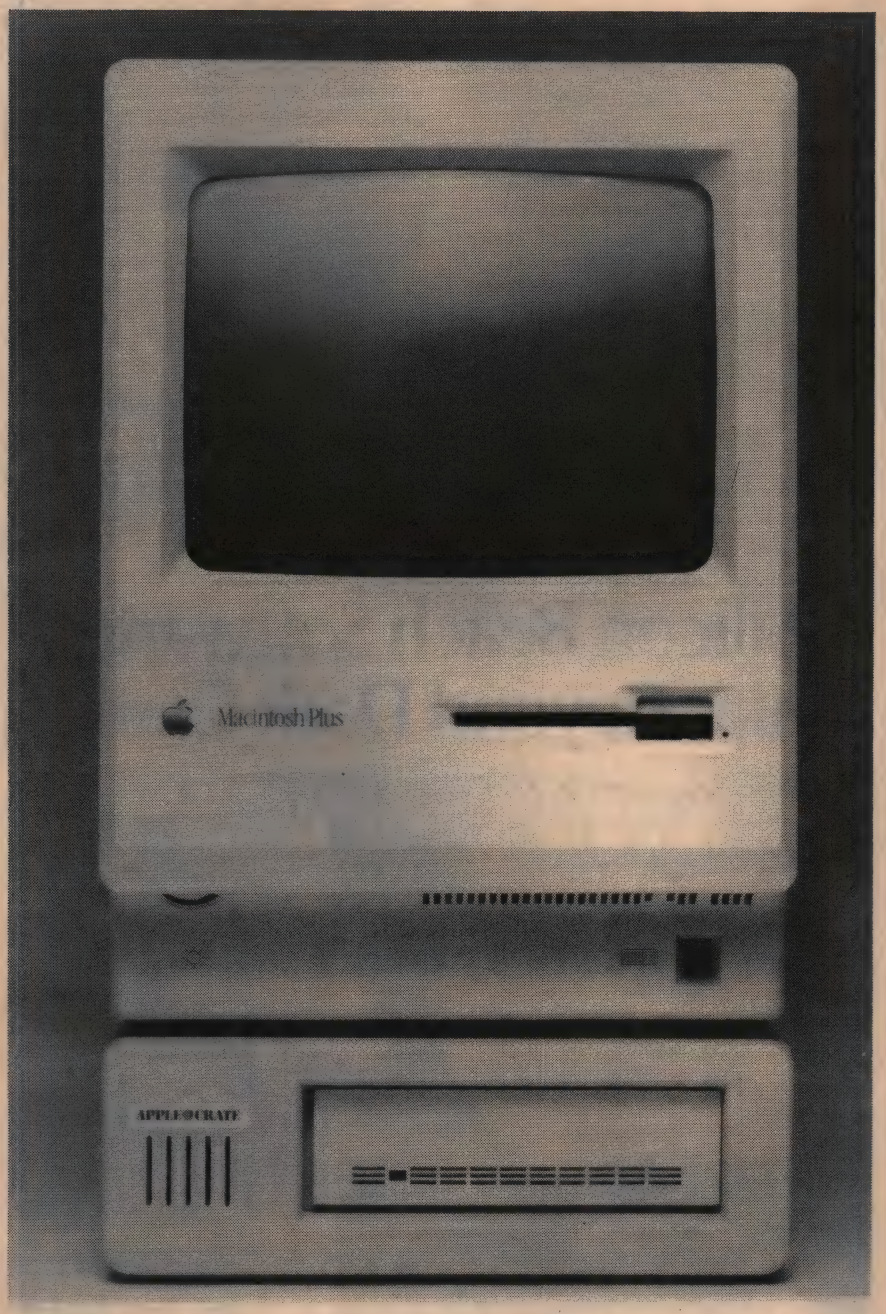
/Helvetica findfont [6 0 0 6 0 0] makefont setfont /charkern 1
72 mul 300 div def /spacekern 1 72 mul 300 div def /pixel {72
mul 300 div} def 100 200 moveto (FREE FONT) fineprint

showpage
```

• • •

Free LaserWriter and Postscript Help: (602) 428-4073 { voice }
(409) 244-4704 { BBS }

Apple Crate—Mac External SCSI Drives



The Apple Crate line of external hard disk sub-systems provides Apple Macintosh users with a high-performance SCSI drive at low cost. Featuring the reliable Seagate SCSI drive shock-mounted in a sturdy cabinet that fits conveniently under the Macintosh, the Apple Crate is available in 20, 40, and 60-megabyte models. It is compatible with the Apple Mac Plus, Mac SE, and Mac II. The Apple Crate is supplied with all necessary cabling and software for easy, trouble-free installation, and tech support is available via an 800 number. The Apple Crate is available from Apple dealers at a suggested retail price of $560 for the 20-megabyte system, $770 for the 40-megabyte, and $839 for the 60-megabyte. The systems are covered by a 2-year warranty on parts and labor.

"As far as we can see, there is no reason for the high prices Mac users have had to pay for add-on SCSI drives," says Chris Lemoine, president of Apple Crate, Inc. "We've taken the Seagate SCSI drives—the most reliable in the industry—and packaged them at a price that puts them within reach of more users than ever before. For instance, the average price for a 50-megabyte SCSI system is between $1100 and $1200. We give the user 60-megabytes for only $839. And the Apple Crate software is so easy to use that installation is literally a matter of minutes."

Each Apple Crate sub-system features an additional SCSI port that allows the daisy-chaining of up to 7 SCSI devices, with an externally-accessible SCSI ID selector. The software supplied with the Apple Crate system includes utilities for formatting, initializing, testing, and verification of the disk, and help information on all functions. The 20-megabyte system features an average access time of 65ms, the 40 and 60-megabyte systems' access time is 40ms. Both the 40 and 60-megabyte systems also feature automatic head-parking for additional data security.

For further sales information, contact Apple Crate, Inc., 6850 Vineland Ave., North Hollywood, CA 91605. Phone: (818) 766-4001. ●

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- Monochrome Graphics Card with printer port
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- 640K memory on main board
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- Socket for 80287 math co-processor
- Floppy/hard disk controller
- Serial/parallel/clock-calendar
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- 20 MB Hard Disk (40 MB option)
- 12 function AT style keyboard

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■ CRT Portable AT
- 6/10 MHz 80286 processor
- 640K memory on main board
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- One 1.2 MB Floppy Disk Drive
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- Floppy/hard disk controller
- AT style keyboard
- 200 Watt power supply

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■ LCD Portable XT
- 4.77/10 MHz 8088-2 processor
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- Monochrome Graphics Card with Printer Port
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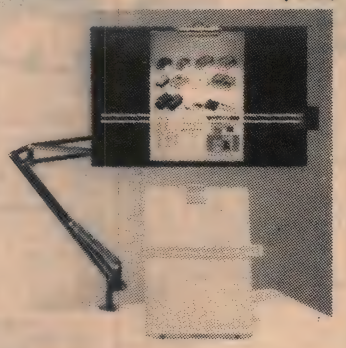

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MacWorkStation Programmer's Guide (150 pages, $16.50), MacWorkStation Programmer's Reference (220 pages, $18.50). Resources for programmers who wish to write applications for host computers which support the standard Macintosh interface. Does not include MacWorkStation software, which is available directly from Apple Computer.

A/UX Network System Administration (250 pages, $18.50), A/UX Network Applications Programming (200 pages, $18.00) Documentation for those wishing to write network applications or set up a network under Apple Computer's implementation of the UNIX operating system.

The Apple Computer products are new in the April, 1988, issue of the *APDAlog*, distributed to APDA members each quarter. The products are available to members only, with membership dues at $20 a year in the U.S.

The Apple Programmer's and Developer's Association was founded in August 1986 as a subsidiary of the A.P.P.L.E. Co-op in Renton, Washington, under the sponsorship of Apple Computer. The non-profit Association now has over 20,000 members. APDA publishes and distributes Apple Computer technical products and languages that are not available through normal retail channels. •

Silicon Beach Software Ships Beyond Dark Castle

Silicon Beach Software, a leading publisher of graphics and entertainment software, has begun shipping Beyond Dark Castle, a sequel to Silicon Beach's best-selling Dark Castle. Retailing for $49.95 and shipping on two 800K disks, Beyond Dark Castle features a fast-paced arcade style of play with detailed graphics and animations, RealSound digitized sound effects, and an intriguing game concept. Using the mouse and keyboard, players explore the eerie Dark Castle in a challenging quest for Magic Orbs. Stealing all the Orbs enables the player to enter the Black Knight's chambers for a final, cataclysmic showdown!

Silicon Beach Software President Charlie Jackson stated, "With Beyond Dark Castle, we've given folks a game that incorporates new technology, includes most of the suggestions we received from the original Dark Castle, and is an exciting continuation of the first storyline. This new game is every bit as exciting as Dark Castle was and is compatible with the Macintosh II. We're quite excited to complete Silicon Beach's entertainment history with a game like Beyond Dark Castle!"

Highlights Of Beyond Dark Castle

There are several new twists to Beyond Dark Castle. Full-screen scrolling effects are featured in two labyrinthian mazes, scenes outside of the Castle which the hero Prince Duncan explores with a special chopper-pack to fly through the air, and the Black Knight's own spooky chambers. As players move Duncan toward the edge of the picture, the entire Macintosh screen scrolls to show more of the area. This feature allows for uninterrupted play throughout a series of scenes, making the game more fast paced.

To assist in learning Beyond Dark Castle, the game includes practice

continued on page 355

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Arkanoid
continued from page 206

and lose one each time the energy ball gets past you. Lose all three, and Arkanoid allows you the option of beginning a new game, or like the coin-op, continuing from where you left off. The game has 32 levels, each with its own pattern and corresponding challenge. You may begin a game at any of the first 20 levels and work your way up. Should you survive Level 32, you'll get to meet ol' Fractal Face—the Easter Island refugee who graces the cover of the game's packages. The top five scores are saved to the disk.

It's interesting to note that Arkanoid is sold by Discovery Software, a company that until now was most famous for Marauder II, a disk copier that for some strange reason will not copy Arkanoid (imagine that). Perhaps in anticipation of the public outcry over this strange example of corporate Double-Think, Discovery includes a card with the game that allows registered owners of Arkanoid to purchase a backup disk for only three dollars.

Say what you will—something about this game has struck a chord with the gaming public. Versions have been ported for every computing machine shy of the Timex Sinclair, but other versions pale against the Amiga's stunning graphics and bright, stereophonic sound.

The inevitable me-too's have already arrived; Arkanoid clones boasting more levels, better sound, more action—but none are as sublime. Accept no substitutes; Arkanoid on the Amiga is the coin-op version. If you liked the arcade machine, Arkanoid is a must. If you never played the game, you're in for a treat.

For further information contact Discovery Software, 163 Conduit Street, Annapolis, MD 21401; (301) 268-9877. Suggested list price $49.95. ●

Beyond Dark Castle
continued from page 354

rooms where players hone their skills and a special computer room that enables them to save games in progress, but only after fighting their way back to this room!

All the action in Beyond Dark Castle was programmed by Jonathan Gay. Jonathan is well-known for his programming on the original Dark Castle as well as Airborne!, the hit game of 1985. Mark Pierce is the creative genius behind the game both designing it and producing all of the artwork. Eric Zocher, the vice president of Software Development at Silicon Beach, programmed the sound for Dark Castle and Beyond Dark Castle. Beyond Dark Castle also includes professional voice-over work as well. Dick Noel, the first voice of Fred Flintstone, vocalized many of the sounds in his San Diego sound studio.

Two 800K disks were necessary to store Beyond Dark Castle because of the tremendous amount of disk space required by the digitized sound and bit-mapped graphics. Zocher commented, "We design our games from the very beginning to incorporate digitized sounds that are short and can be repeated often, while still sounding good. This, coupled with the proprietary compaction technique we've developed for digitized sounds, has the net effect of allowing us to pack twice as much sound onto the disks as other companies can."

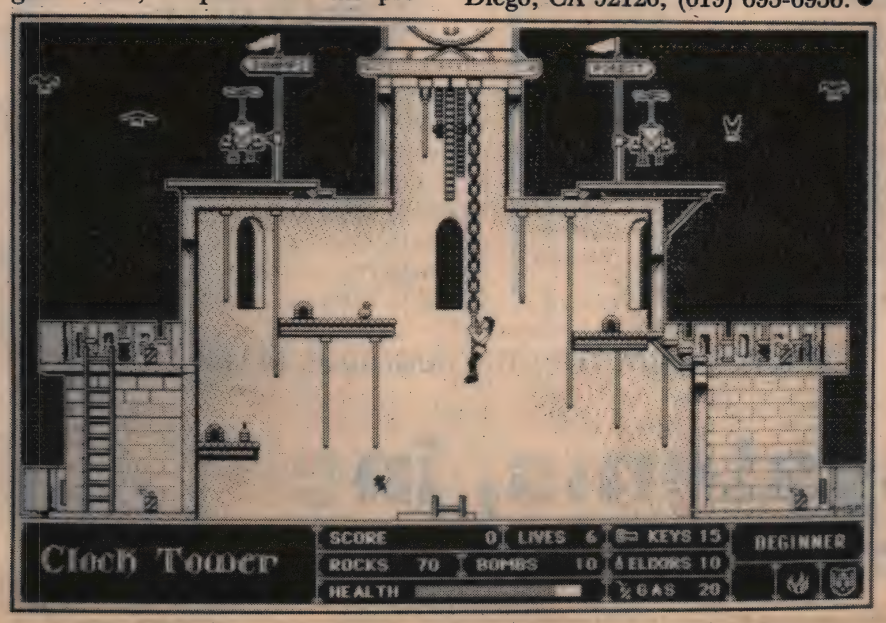
Leading-edge software techniques, combined with flicker-free animation, professionally created sounds, and a thoroughly delightful game concept will make Beyond Dark Castle a sure winner in the Macintosh entertainment marketplace.

Pricing, System Requirements And Product Line

Beyond Dark Castle runs on the Macintosh 512KE, Plus, SE and Macintosh II. A single 800K disk drive is all that is needed to play the game; it is also hard disk compatible (not copy-protected).

Silicon Beach Software, Inc. publishes only Macintosh software. The company's product line includes SuperPaint, the top-selling paint/draw program; Silicon Press, a label and forms printing program; and entertainment titles Apache Strike, Dark Castle, Airborne!, Enchanted Scepters, and World Builder. Soon to be released products include Digital Darkroom and Super 3D.

For more information contact Silicon Beach Software, 9770 Carroll Center Road, Suite J, P.O. Box 261430, San Diego, CA 92126; (619) 695-6956. ●



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Amiga Workbench
continued from page 205

direction and a good selection of dissolves. In any presentation, it should be remembered that the method of getting from one picture to another is almost as important as picture content, and any transition device you will ever need is probably here.

A show could be made up of a series of screens, but you'll probably find it more interesting to add "Objects" and movement where applicable. Objects are what we normally think of as "brushes" (in Deluxe Paint) or "windows" (in Aegis Images). Add an object in the same way you added a screen, but now your screen appears so that you can place the object in the proper position. Note that this is the ending place for the object.

The method of the object's appearance is controlled by the Cut button and the method of it's exit by the Off button. Here again, you are returned to the Cut menu and now have a variety of ways in which to cause an object to appear.

In my case, the screen was the surface of an alien planet. After a three second delay, a dragon slid in from screen left: two seconds more and fire appeared at his mouth; another second and the entire scene cycled through it's color palette (another option). Shortly after this, the wizard dissolves into view in the lower right screen and a bolt of lightning flies from his hand (missing the dragon). Then the knight on horseback slides in diagonally from upper right and he, presumably, will save the day.

In creating the sequence, I used only a fraction of the tools given by TV*Show. Other shows, quickly created from existing files, introduced me to the variety of dissolves and wipes and impressed me no end.

One word of caution: while TV*Show allows for placement of objects within your screen, it does not allow for sizing or rotating objects. Make it a point to lay out your scene in whatever painting program you used to create it and do all the necessary sizing and rotating before saving the object as a brush. This done, placement within the script of TV*Show will be quick and easy.

Although a script may be complete, you can change it by entering the Edit mode and can even insert new routines if you feel they are necessary. In the sequence described above, I first went directly from the appearance of the wizard to the appearance of the knight, and only later inserted the business with the lightning bolt.

TV*Show also supports the Amiga "narrate" command so that voice can be added to your scripts (as it is in the Tutorial) and the voice can be male or female; expressive or not. Shows can be created with scene changes programmed or with such changes taking place only after a keypress, making it easy to tailor a show to your eventual audience; and shows can also run in a continuous loop for the kind of unmanned display that might be used at a convention or trade show.

Although 512K can be used, it cannot be used efficiently. My feeling is that 1 meg of memory and two disk drives are the minimum configuration for TV*Show. Since the disk can be copied, it can also be installed on a hard disk and this would be the ideal setup for lengthy shows.

TV*Show is a product of Zuma Corp. and is published by Brown-Wagh Publishing Co. at 16795 Lark Ave., Suite 210, Los Gatos, CA 95030. Suggested list price was not available.

Also new this month is Wordplex from PAR Software. Don't start getting excited about a new word processor, because that's not what it is. Instead, maybe you can generate some excitement in knowing it is a version of Wheel of Fortune but, sadly, without Vanna White.

After booting, the playing screen holds a variety of pulldown menus in which you can select the number of players (one to six), the category from which you wish the word puzzles to be drawn, and voice on or off. Yep, like the TV show, Wordplex does have an announcer who will tell you when it's your turn and who will also pronounce the phrase once it is solved.

Once a game has begun, however, the only choice left on the pull down menu is to quit, making it impossible to change anything unless you reboot the program. Oh, well. Perhaps it works like this to keep us honest.

At the top of the screen is the message board with the hidden letters indicated by blue blocks. At middle left is the scoreboard, which keeps track of the amount of money won (or lost); at center is the alphabet; and at far right is a square representation of the big wheel.

To play, click on the "wheel" and a cursor flickers around and comes to rest on an amount or on Bankrupt or Lose a Turn. Assuming neither of the latter two happened, you then click on a letter in the alphabet and if you are correct it will appear in all it's proper places on the message board. If not, you'll hear a flat note and the Amiga voice will indicate the next player.

Games are played in a series of three rounds, each round being of the winner-take-all type, and at the end of round three the accumulated scores are shown.

There are said to be over three hundred trivia phrases on the disk, from categories such as People, Places, Things, Quotations, Events, Cliches and so on. Three other data disks are currently available and cover America, Nature and the Bible. Further, you can modify the database of Wordplex to hold your own words and phrases so long as you stay within string guidelines.

With the continuing interest in trivia games and the continuing success of Wheel of Fortune, we expect Wordplex to find a ready audience. Though I'm not a fan of the TV show, I do enjoy word games of all types and I'm finding this one to offer a lot of hours of fun.

Wordplex is available from PAR Software, Inc. at PO Box 1089, Vancouver, WA 98666. 512K and one disk drive are required.

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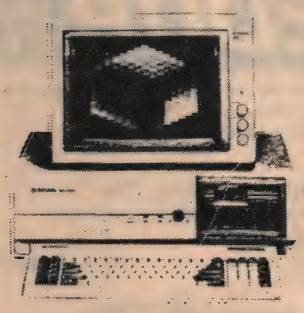

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Amiga Workbench
continued from page 356

It is probably pertinent to mention that PAR has also just released version 2.0 of ExpressPaint. With fixes, new tools and new icons, it offers several improvements over version 1.0. Owners of version 1.0 may upgrade for $20.00, a part of which covers the cost of new packaging and new documentation that doubles the size of the previous manual.

Continuing the "One To One" series that began a few months ago with FirePower, MicroIllusions has just released Galactic Invasion, an arcade-style game with several worthwhile extras.

Like FirePower, the playfield is two separate screens, in this case one arranged above the other and each showing a view out the front of a spaceship. You control only one ship and the idea is that you are racing your opponent to gather the five pieces of a doomsday device. The winner gets to destroy the other's galaxy.

It's not quite that simple, however. First, your opponent can be a friend on a second joystick; the computer; or a friend (who owns the same game) on the other end of a modem link. Nor are the pieces of the doomsday device all that easy to gather. First, they are encased in satellites orbiting the various planets and the only way to get them out is to blast the satellite. Once this is done, the piece of the device is floating free and you must scoop it into your ship in a kind of docking maneuver—much more difficult than blasting the satellite.

Even then, you'll have some problems: there are five pieces needed to complete the device but fifteen pieces are scattered around space. If you begin by collecting blue pieces, you'll be unable to collect any other color, and since you don't know what a satellite contains until you've blasted it, you can rest assured that some of your shots will aid and abet the enemey.

Nor is that quite all. There will be times when you and your enemy share the same area of space, flashing by on one another's screens and thus able to blast one another directly. Doubtless because there are not hazards enough, the sun has been given a strong gravitational pull: venture near and you're toast.

In the arcade action and the challenge of developing a strategy, Galactic Invasion will take some time to master and thus should provide a lot of entertainment. As always with products from MicroIllusions, the sound and graphics are very well done. And, as with FirePower, all documentation is on the disk.

Galactic Invasion is a product of MicroIllusion at PO Box 3475, Granada Hills, CA 91344. Suggested list price is $24.95. 512K and a joystick are required.

Speaking of arcade action, we've also found a treat in the form of a series of games from Constellation Software. Although their stated purpose is to make available to America some of the better games from abroad, I found a familiar friend in a game called City Defense.

A long time ago, this was a game for the Atari VCS machine and it was called Missile Command. Much later, I saw a Macintosh version that was distributed as shareware and was called Wizard's Fire. Now it is available for the Amiga and that probably proves that there will always be a market for the classic games.

As you'd expect, the graphics and sound are much better than in any of the previous incarnations, and this is because the game has been rewritten for the Amiga rather than being any kind of port. Control of the game is by mouse and you're going to need your desktop cleared of all obstacles to mouse movement before starting this one.

Following a beautifully animated title screen (which has nothing to do with the game) you'll go to the single screen of City Defense. At bottom are six cities and flanking these at far left and right are your anti-missile stations, the left station controlled by the left mouse button, the right station controlled by the right.

After a brief wait, missiles descend from the top of the screen, trailing long colored contrails. By moving the mouse, place the crosshair in the path of a missile (not on it) and press one of the first buttons. If you've aimed well, the missile will be destroyed in the blast.

Since you have a limited number of anti-missiles, the strategory is to try to destroy several incoming missiles with one shot. In fact, since most of the missiles are MIRVed, you'll have to do this. The prime object, of course, is to destroy the missiles before they can destroy your cities or your firebases.

In any level, there is a finite number of incoming missiles, but the number grows with each level and the speed with which they come at you increases. Scoring is based on how many anti-missile missiles you have left at the end of a round, as well as how many cities are left standing. Extra points are also earned for destroying the alien objects that sometimes fly across the screen and you'll have to judge for yourself whether it's worthwhile to turn your attention away from the missiles in order to take a shot at them.

Progression from one level to the next is a matter of surviving: so long as one city remains standing, you're still in the game. Lose the last city and it's all over. But with a little bit of luck, you may be able to write your name on the "hall-of-fame" scoreboard.

As the latest incarnation of a classic arcade game, City Defense is very good and the challenges are real. Graphics, sound, and gameplay are extremely good and this raises an interesting question.

How can they do it for $19.95? City Defense is self-booting, needing no Workbench disk. Granted that it is not an original game (which might mean the rights were inexpensive), still it has been rewritten to take advantage of Amiga graphics and sound which should count for something. Yet the program has a suggested list price of only $19.95. And the question, obviously, is why can't more software producers follow suit?

City Defense is available from Constellation Software at 17 St. Mary's Ct., Brookline, MA 02146. 512K and a single disk drive are required. ●

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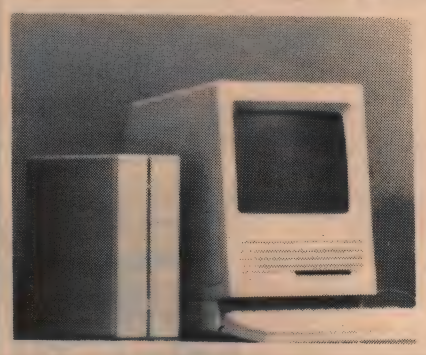

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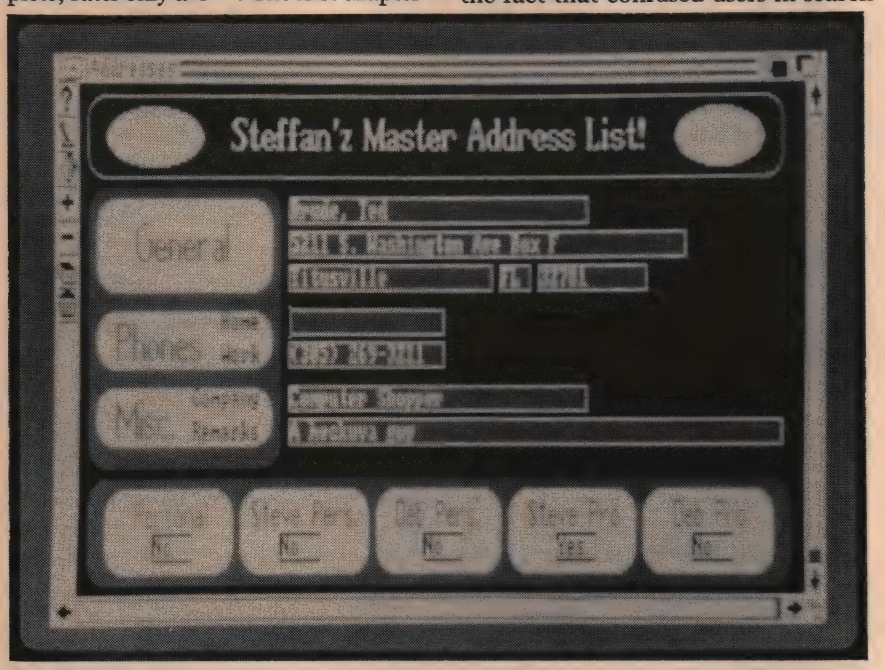
Amiga Database
continued from page 205

object oriented approach treats screen elements—such as shapes, lines, and headings—as individual objects which may be freely moved, resized, duplicated or deleted. Data entry and display fields may be manipulated as well. A screen mask can extend past the borders of the screen, up to 5,000 by 5,000 pixels maximum. Form and list masks, used to format printed output, may extend up to 255 columns by 1,000 rows.

The manual, while reasonably complete, rates only a C – . The first chapter introduces the basic concepts of databases and mask-oriented operation; chapter 2 takes users through a tutorial covering DataRetrieve's most elementary features, and chapters 3 through 7 offer detailed reference for each of the program's main menus. Chapter 8, which takes up about 25% of the documentation, covers use of masks, the mask editor, and reports. A series of appendices follow, including a glossary and technical specifications. An index rounds out the manual.

The index is adequate but not comprehensive. Some of the page numbers listed are incorrect. More distressing is the fact that confused users in search of information are frequently referred back to the glossary, rather than to a portion of the manual that could provide answers!



Conflicting references indicate more time needed to be spent on technical editing; page 44 correctly states DataRetrieve's maximum index precision at 100 characters; page 115 claims precision to 999 characters. On page 34 the manual says field lengths default to 30 characters, while page 65 accurately claims 35.

Most topics are presented reasonably well, but instruction in other areas falls disastrously short. Individuals expecting to import records from their old database program are in for an especially "interesting" time. I'll have more on that topic later.

DataRetrieve includes on-line help, but it is of limited usefulness. Its descriptions of functions are not appreciably better than the manual's glossary, though hotkeys and command mode sequences are included. The many misspellings throughout do not do a lot to inspire confidence.

Copy Protection?

DataRetrieve takes a unique approach to protecting the software from unauthorized copies. Abacus' advertising for DataRetrieve states the program is not copy protected, and that's true after a fashion. The first time you attempt to use DataRetrieve, you are presented with an entry screen that asks you to type in such personal data as your name and address, and the serial number of the program. This information is encrypted into your copy of DataRetrieve as part of what Abacus refers to as the "installation" process. If you attempt to copy the program without first performing this step, the copy will be unusable. Once DataRetrieve has been "installed," you may make as many copies as you like, either to floppy disks or to a hard drive. Presumably, would-be pirates will think twice before spreading around software with their name emblazoned on it.

Database Directories

DataRetrieve creates a separate directory for each database. This is a good idea because besides that actual database file, DataRetrieve maintains index files, function key files, selection files, definition files, plus multiple mask files for data entry, selection, and reports! Keeping these files together is a plus for two reasons. First, because of how AmigaDOS keeps track of files, separate directories facilitate faster directory listings. Second, having all files associated with a particular database stored together makes it very easy to copy the database to another disk. The database appears as a drawer in the disk's Workbench window that can be moved to another disk in one quick point-and-drag operation.

DataRetrieve's documentation claims up to eight databases may be open at one time, but does not offer any reason in particular why one would want that many open simultaneously. Unlike Superbase Personal (reviewed last

continued on page 359

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month), DataRetrieve is not a relational database; apart from going to the trouble of transferring raw data, DataRetrieve offers no facility for sharing information between more than one database.

Password Protection

Like Superbase Personal, DataRetrieve allows multi-level password protection. "Operator" level protection allows full access to all database functions; "user" access gives what amounts to "read-only" permission.

Unfortunately, DataRetrieve's "security" measures have all the same holes as Superbase Personal's. Once a password has been assigned, it may not be changed. This alone limits its security value in a small-business environment, since it's always a good idea to change passwords when an employee leaves. Because password protection does not change the essential structure of the data file, the unformatted information may still be browsed using the AmigaDOS "TYPE" function. Finally, the password appears on screen each time it is entered.

DataBase Definition

Initial database definition is extremely fast. The Create New File screen has only one text gadget used to enter field names, and six colorful icons illustrating each of the six field types supported. Unless you specify otherwise, fields are assigned as text. It's easiest to enter all the field names in one operation, then go back and change individual fields to specific types as required. Besides text fields, DataRetrieve supports date, numeric, time, choice, and external IFF graphic field types.

Text fields may contain any combination of any characters; in a newly-created database the field length is set to 35, but this may be changed by varying the size of the field using the mask editor. Maximum field length is 32,000 characters, which should suffice for most applications!

Date fields are supported in any number of user-definable formats. You may also enter "TODAY" in a date field, which sets that field's value to the date stored by the computer's system clock. Offsets are also allowed; "TODAY + 90" sets the field to three months from the current date.

Many options are allowed for numeric fields, with precision to 15 places. Information may be entered as literal numbers or as formulas; the common mathematical functions are supported, plus trigonometric functions and greater than/less than comparisons. The DATE operator in a numeric field returns the Julian date, and TIME returns the number of minutes since midnight. Calculated fields—that is, using the information contained in other fields to calculate a new field's value—are not supported.

A separate "Time" field type allows time entry in HH:MM format, on a 24-hour clock. Many formats for time display are allowed.

The "choice" field type allows only precise matches of up to forty different values. Permissible values are entered in the choice field during database definition, separated the vertical-line character. For instance, if you wanted to limit the input of a field to yes/no values, you could define that field's choices as "Y:y:N:n." As you may have noticed, choice comparisons are upper- and lower-case sensitive.

Once a choice field has been defined, that field will not accept values other than those specified. If an incorrect value is entered, DataRetrive replaces its value with the last value in the comparison list. In the case of the example given in the previous paragraph, a "G" entered in the Yes/No field would be changed to an "n." I'm not too wild about that; it would be preferable for the program to display a warning that an illegal value had been entered. One way around this might be to make the last value in a comparison list a warning flag—for instance, "Y:y:N:n:***ILLEGAL VALUE***."

In a feature that has become all but standard with Amiga database programs, DataRetrieve can display IFF graphics, though only the picture's title is actually stored in the database.

While exploring DataRetrieve's data entry abilities, I discovered a fairly significant bug.

As noted previously, new fields default to 35 characters, though fields may be expanded or shortened using the mask editor. However, if when entering data you type past the limits of the field, DataRetrieve does some rather original "data processing"—the extra keystrokes, while not appearing

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on screen, are entered into the data file—backwards! For instance, if you defined a field as three characters long, and entered "123456" into that field, the "456" would not appear in the mask—but would be recorded into the data file with the visible portion of the entry, as "123654!" As a test, I entered the sentence, "This is a test to see if that mask thing is really a glitch!" into a 35-character field; the result, as output by DataRetrieve's "Print List" function, was "This is a test to see if that mask !hctilg a yllaer si gniht." If incantations from H.P. Lovecraft horror stories spontaneosly appear in your database, this is probably why.

Besides control of field size, the mask editor also allows you to designate fields as repeating, required, or verified. In the latter case, you are prompted to enter a range of "legal" values for that field. Finally, a time or date field may be defined as "automatic," in which case the value for that field will be supplied by the system clock when the record is entered.

Entry Control

Seven tiny icons are squeezed into the left window border of the active screen mask. The same mask may be used to enter, edit, or browse records, and each of these icons provide different means of control.

The top icon may display as either of two symbols; as an exclamation point, it denotes data entry/edit mode; clicking on the second icon from the top, a miniature gear-shift, changes the exclamation mark to a question mark, indicating "search" mode.

Browsing Records

The next two icons, a plus and a minus symbol, display the next record and previous record, respectively. Clicking and holding allows you to browse the database in either direction. A double click on the plus sign takes you to the last record in the database; double-clicking the minus sign takes you to the first record. To keep DataRetrieve from confusing repeated single-clicks from double-clicks, the designers set the click timing control in Workbench Preferences very near the top of its range. That's kind of a brute-force-and-ignorance approach, but it does the job.

Multiple Search

DataRetrieve's search capability is powerful and very easy to tap. To enter search criteria, you must first click on the eraser icon to clear all fields. Any information entered in the fields in search mode is treated as search criteria. Entering criteria for more than one field is as easy as entering the data you want to look for into the respective field requesters, much as if you were entering a record. Wildcards are supported, ranges may be specified, and "OR" comparisons are allowed. Searches are not case-sensitive.

Global queries are allowed by field or by record. Entering /value in a field will return all records containing "value" in any portion of that field; entering \value searches every field in the record.

Once the search criteria has been entered, DataRetrieve presents the first record in the database which matches the criteria. Subsequent records may be browsed using the plus or minus gadgets as previously described.

Flexibility in methods of qualifying data, combined with exceptional ease of specifying criteria across many fields, makes DataRetrieve's search capability the strongest of the databases examined so far in this survey.

Card-File Indexing

As described in last month's article, indexes are one popular method used to quickly locate information within databases. DataRetrieve does not require a database to be indexed, though operating without an index will slow many functions. While you may define up to 80 indexes per database, only one may be active at a given time.

DataRetrieve allows users to specify the amount of precision by which the index is sorted. The minimum precision allowed is to one character, and the maximum precision is 100. The program defaults to 20, which should be adequate for most needs. Less precision means increased chance of similar records being incorrectly sorted; for instance, an index with a precision of 8 cannot tell the difference between "Southerland" and "Southerlund," because the first eight letters are the same in both. A larger index, while offering greater precision, also requires more space, both on the disk and in memory. You will have to balance your need of precision against your system's capacities.

In addition to using the index to locate and order records, DataRetrieve allows users to flip through the index directly, much like a desktop card file—it even uses a Card File icon to represent the function. Clicking on the

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Card File opens a window with a scrolling listing of entries from the current index; if you want to quickly locate the record for SMITH, for instance, all you need to do is scroll to SMITH, click twice on the name, and the desired record pops into the screen mask. It's very fast, convenient, and easy to learn—after all, people have been using the same technique with 3x5 cards for years!

Subranges

DataRetrieve's subrange feature is similar in function to its search mode. By defining a subrange, you may filter out entire ranges of records, allowing you to edit, view, print, backup or delete only those records meeting criteria you define.

A subrange, once defined, acts much like a database within a database. The full database's index is suspended, but you may sort on one field or several, then generate a report on just the subrange.

Subranges may be stored, in a manner similar to Superbase Personal's "Query" process—though DataRetrieve's method is less elegant and more prone to error. As detailed in last month's column, Superbase stores the subrange definition in a "query" file. DataRetrieve, by contrast, stores an index-like listing of those records that were contained in the subrange at the time the subrange was defined. Hold on to that thought; I'll be coming back to it.

The first problem becomes apparent when you initially define the subrange, and the program takes off into Never-Never Land for a few minutes. It is actually building an index, and that takes time.

The second problem with this approach is, it is impossible to edit—or even view—an existing subrange definition. Depending on the complexity of the subrange criteria, that could be a pretty serious drawback.

I alluded to the third problem with this approach a moment ago. DataRetrieve stores an index of pointers referenced to actual records within the main database. Unlike a true index, however, the subrange file is not updated as records within the database are added, edited, or deleted. The manual puts it more directly: "If the contents of the subrange have changed since the subrange was saved, then the contents of the subrange is inaccurate." Unfortunately, the program does not tell you this when you recall the subrange— a design flaw just this side of what some people would call a bug.

Command Mode

DataRetrieve makes full use of all Intuition features such as the mouse, icons, and drop-down menus. Hotkey equivalents—such as Right-Amiga-O to open a file—are also supported.

To these, DataRetrieve adds a cryptic but potentially powerful method of operation called "command mode." To enter command mode, you first press the Esc key at the top-left of the Amiga keyboard. The word "Command:" appears on the menu bar. You then choose a function from one of the program's main submenus by pressing the first letter of the submenu: F for File, E for Edit, I for Input/Output, etc. Next,you enter a letter corresponding to a selection on that menu; in the case of the File menu, choices include O for Open File, C for Close File, or P for Pack File. To open a file using command mode, you would type Esc-F-O. Escape commands may extend down multiple menu levels; Esc-E-D-F would allow you to Edit Data record First. It's a bit more than a casual user might want to learn, but someone who spent a lot of time with DataRetrieve could fly using this mode.

Default Settings

One area where DataRetrieve really shines is in its ability to be customized to suit individual user needs. You may define up to twenty macrokeys per database, using the Amiga's function keys, normal and shifted. These keys may be used to call frequently-used functions using the command mode codes, or to type out frequently-used text strings. Macrokey definitions may be changed at any time.

Though DataRetrieve defaults to four colors, you may set it to initialize at eight or 16 colors, in normal or interlaced mode. While more color makes applications more attractive, it slows the program considerably. In one test, DataRetrieve took one minute, 55 seconds to build an index on a 1000-record file in four-color mode. The same job required over four minutes when run in 16 colors. Requesters and menus also become markedly less responsive in the more colorful modes.

DataRetrieve has another option we haven't seen nearly often enough; the ability to assign which devices appear on file requester buttons. The program comes set for DFO:, DF1: and RAM; but any or all may be changed—good news for users of VDO:, JHO:, or HDO: devices!

Printer Masks

Up to now we have dealt mainly with the screen mask; DataRetrieve also supports two types of printer mask. While primarily intended for use with hardcopy devices, the Form and List masks also handle output to the screen, or to a separate disk file with ease.

A List Form, as its name implies, allows simple columnar output of database records as a long list. A Print Form, by contrast, allows a great deal more flexibility, including multiple-line records and labels. Both formats allow attributes such as boldface, italics and underlining to be used within the report. Headers and footers for each page may be defined, as can page format to include lines per page, pica, elite or condensed pitch, and Near Letter Quality print. Characters per line automatically change with the pitch

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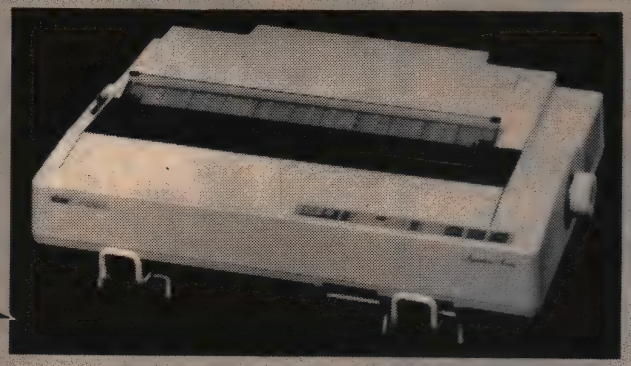

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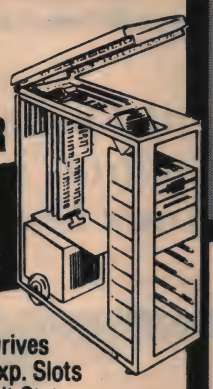

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Amiga Database
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selected, though you may enter your own value if you prefer. In any case, DataRetrieve will not let you design a printer mask that exceeds the size of your paper—a feature you will appreciate all the more if you've worked with less considerate programs!

Data In & Out

DataRetrieve supports data import/export in two formats; its own "DR" format, and a raw text format.

Alas, this is one area in which DataRetrieve is woefully lacking. As discussed in the first installment of our database survey, the ability to accept raw data—a process known as "data import"—is important, because the alternative can be retyping hundreds or even thousands of records. Besides being tedious, the chance for inducing errors into the database is great. Data export—a program's ability to output raw information in a transportable format— is also important, because it allows you to share database information with other programs, such as mail-merge applications. Competent data export also keeps you from being stuck reentering data when you upgrade to a new database program.

One of the problems with attempting to import data in DataRetrieve's raw text format is the documentation's scant instruction on how to do it. One very important detail omitted is the fact that the file to be imported must have a filename ending in .DIF. I won't tell you how long I wrestled with that before I figured it out. DataRetrieve will let you enter a filename to import, but unless that name ends in .DIF, the program flashes, "The file does not exits!" Yes, "exits."

The .DIF extension may lead you to believe that DataRetrieve uses the popular Data Interchange Format for its text import/export functions. Though the documentation claims DIF compatibility, this is not completely accurate. The Data Interchange Format was developed in the late 70's for use with VisiCalc, the spreadsheet precursor to Lotus 1-2-3. While information contained in DIF format is stored in ASCII (text) format, true DIF also includes numeric indicators within each record to indiate where to locate information within a matrix.

DataRetrieve's so-called "DIF" files lack these numeric indicators; in fact, formatting consists solely of terminating each field with a line feed character (Hex $0A, decimal 10). When I tried to import a DataRetrieve DIF file into Lotus 1-2-3 using 1-2-3's DIF import function, the program was completely perplexed: "The input file is not a valid DIF file!," it protested.

You are not strictly stuck with DataRetrieve's version of the DIF format. You may specify your own field and record characters, though the program expects you to enter them as hexidecimal! No matter what you enter, DataRetrieve neither reads nor writes standard ASCII delimited files.

Is this a problem? It depends. I read one glowing report on DataRetrieve on one of the commercial information services where the reviewer commended the program for its data import capability. He noted that all one had to do was load the import file into a text editor and hit a carriage return after each field. That well may suffice for a 50-record address file. I would be less inclined to edit my 500+ record album file, however. A program that advertises its capacities in the billions should offer a little more elegance.

One last ding on DataRetrieve's import/export and we'll move on. Exception handling for data that does not match the input field-type is essentially non-existent. Such data is simply discarded without any indication to the user.

Packing It In

DataRetrieve, like many professional databases, does not actually remove records from its main database file when the user asks to delete records. Rather, DataRetrieve marks the record for deletion, and ignores the "deleted" record for all further operations. Likewise, an edited record is not truly changed in the database—it is reentered, and the old record marked for deletion.

The main reason programs handle changes this way is speed. It's much faster to simply flip one byte in the file than to rewrite the whole file just to remove one record. It's also a much safer way to update a file. The drawback is, the file grows with each change. You can easily double the size of a database file without entering any new records—just by changing old ones!

Because of this tendency for often-used files to grow, most programs that update using this method include some way of "packing" the file—that is, rewriting the entire file, less the records marked for deletion.

When you tell DataRetrieve to pack a database, it actually creates a new database using the file to be packed as a template. This is an extremely safe method, because the original file is not altered. However, the method has its drawbacks.

First, a second database takes up space on the disk. If your database requires more than half the disk, you will need to pack it to a second disk. The documentation warns single-drive users not to attempt this, because of the number of disk-swaps required. Instead, single-drive users are advised to pack to RAM if enough is available, or to break up the file into subranges and pack each one separately. That doesn't sound like much fun.

In any case, the result of a successful pack operation is a new database under a different name. This database will be contained in its own directory, with a default screen mask. If you have defined other masks, default files or function key definitions, these are not transferred. The easiest thing to do is to transfer the packed files back into the original directory, which takes some knowledge of the AmigaDOS Command Line Interface (CLI). Again, functional but not elegant.

Overall

DataRetrieve is a difficult product to evaluate. It handles the majority of

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Aegis' Second Annual Desktop Video Contest Begins

Aegis Development Inc. has announced that their second annual Desktop Video Contest has begun, and will run through September 1, 1988. It is open to all Commodore Amiga computer owners who use one or more Aegis products to create desktop videos. Winners will receive prizes ranging from an Amiga 2000 computer system to gift certificates. Entrants may submit their videos anytime between now and September 1st, and may enter as many times as they wish.

"The purpose of this contest is to encourage people in the area of desktop video," said David Barrett, president of Aegis. "There are a lot of talented people using the many new tools to do some fantastic things for not a lot of money. Last year the first place winner, 'So What's The Big Deal?,' was made by three young brothers who invested over 360 man-hours, and the results were phenomenal. The second place winner's animation, 'Dance of the Stumblers' by Steve Segal, is currently touring with the Animation Film Festival and is being shown around the country. So the opportunities are really out there to be tapped."

There are two categories, amateur (not for pay) and professional (for pay). Each entry will be judged in its category for the best animation, special effects, computer and software use, artwork, creativity, editing, story line, sound, and overall quality and ingenuity.

To qualify, videos must be created using an Amiga computer with one or more Aegis products, and any other hardware or software; be submitted on ½" tape; be no longer than five minutes in length; be the work of the entrant (cannot submit someone else's work); and be accompanied by an entry form (available from Aegis or a local Amiga dealer).

The entries will be judged by Desktop Video professionals not associated with Aegis or Commodore. Winners will be announced in September, and the awards ceremony will take place at this year's winter Comdex in November, in Las Vegas, Nevada.

For more information contact Aegis Development Inc., 2115 Pico Blvd., Santa Monica, CA 90405; (213) 392-9972. ●

Amiga Database
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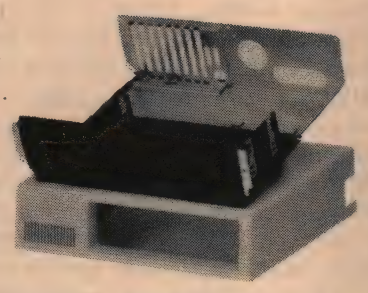
its functions in a competent manner, and is generally easy to use. Its raw capacities—file sizes up to two billion characters, with an "unlimited" number of fields—offer more power than any home user is likely to outgrow. DataRetrieve's lack of standard features such as ASCII delimited file handling, calculated fields and relational operations will limit its usefullness in professional applications.

When compared against the first two programs examined in our ongoing survey, DataRetrieve's capability fits somewhere between the simple File IIsg and the more sophisticated Superbase Personal. Like those titles, DataRetrieve is an original—though as the youngest program of the three, it has a lot of idiosyncrasies. Hopefully, most of these will be ironed out in future revisions.

To Abacus' credit, their reputation for customer support has carried over to their Amiga line; assistance is available during business hours for the cost of a phone call to their Michigan offices. Abacus tech support personnel I spoke with were eager to discuss possible improvements to the program, and expressed a desire for increased customer feedback. Abacus' confidence in DataRetrieve is backed up by a 30-day money back guarantee.

Professional users with complex needs, or those who require information transportability between programs should probably look elsewhere. Nonetheless, casual users in search of a reasonably priced and easy to use database program may find DataRetrieve is exactly what they've been looking for.

DataRetrieve, Abacus Software, PO Box 318, Grand Rapids, MI 49588, 616-698-0330. Suggested list price: $79.95. ●



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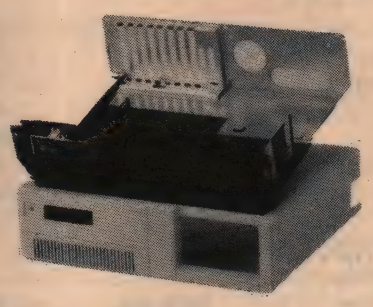

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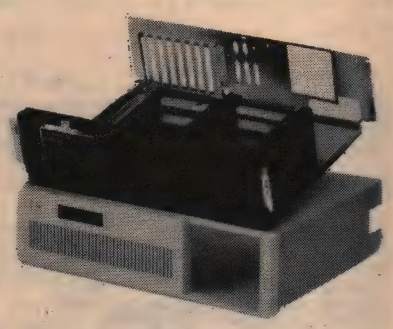

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Soundscape Utilities
continued from page 206

Unfortunately, key velocity mapping is not supported—a major oversight considering that key velocity scaling is sometimes incompatible from one synthesizer to another. Simpler uses of Mapper/Splitter are making keyboard splits, rearranging drum machine keymaps, mapping single notes to chords, or scaling pitch bend or pressure data. More exotic mapping examples are changing pitch bend data to notes or notes to control changes. For monophonic playing you can add a discrete pitch bend to each note for microtonal scales. A useful application is when doubling tracks to send the same note but different control data (modulation or pitch bend) over two MIDI channels, for a more realistic effect as if two musicians are playing the different instruments. If you were willing to spend the time, each note on your keyboard could be redefined to a different type of MIDI data. Using the MIDI Mixer module in conjunction with Mapper/Splitter lets you send any number of MIDI commands simultaneously from a single note. With the Tape Deck's trigger and echo modes, an entire musical passage could be triggered from a single control message. Like the tracks on Soundscape's Tape Deck, the number of maps seems to be infinite.

At long last, SystemX provides a system exclusive dump utility to save your synthesizer's patch or performance data to Amiga files, or load them from your Amiga back to your synthesizer. Strangely, the files are not stored as straight data but in a file format unique to Soundscape. The module works with any system exclusive schemes that do not require handshaking. The only notable exception is voice data for Casio CZ synthesizers. However, since there are several good public domain CZ patch librarians available, this won't be a problem. You need to be able to activate a system exclusive dump from your synthesizer in order to use this module. One problem that does occur is when a synthesizer sends more than one packet of system exclusive data with a single dump request. Since SystemX waits for only the first system exclusive data sent and then immediately writes a file to disk, every packet after the first is lost. Despite this problem, SystemX is essential for storing patch data and backups of drum machine sequences.

Gauge. When installed in the Soundscape modules directory and startup-sequence, this program will automatically open with Soundscape. You get separate fuel gauges for chip RAM and total RAM, plus indications of the largest contiguous chunk from

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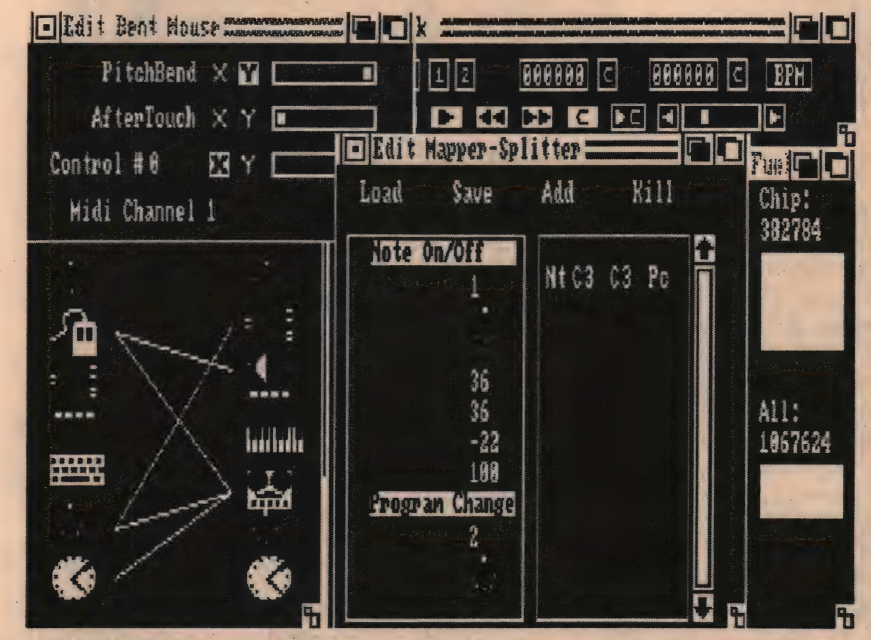

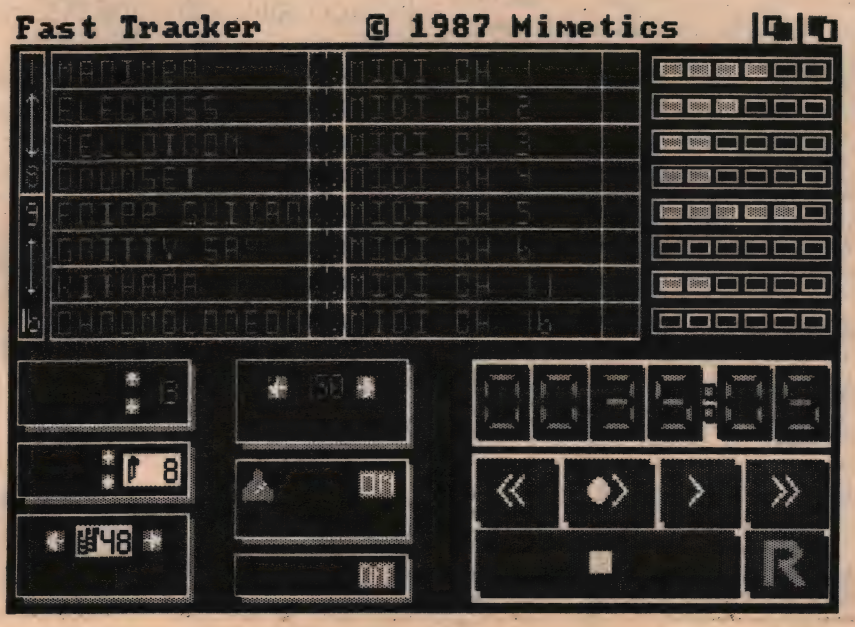

Soundscape Utilities continued from page 366

each. This is particularly handy when you are using a lot of samples which eat up chip RAM rapidly. By checking the largest contiguous chip RAM you can know how much space is left for loading samples before performing the load.

Clock Scaler lets you adjust the ratio of Soundscape's clock to that of external drum machines or sequencers. While normally used to synchronize different clock rates such as 96 pulses per quarter note to 24 pulses per quarter note, more exotic ratios can be created by the avant garde at heart.

An example of Mimetics' move into the visual field is the module Frame Counter, confusingly called Movie, for both its program and icon files. It creates a text file "hit list" of musical events from a score at a given tempo. The file is in units of seconds and frames used in film production. Time is graphed along the Y-axis and MIDI channels along the X-axis. This module may also prove useful to the musically-exclusive Soundscape user, as to date, it's the only way to get a hardcopy listing of your sequencer data. Unfortunately, most Amiga users would rather see a framecounter in units of 30 frames per second rather than 24, for use in desktop video production.

Smooth Clocker is the easiest module to use, as once it's installed all it does is replace the Clock module in the original Soundscape. The timing is smoother and as precise as any other sequencer on the market. So much for the myth that the Amiga can't handle accurate MIDI timing.

Documented in an addendum is Fast Tracker, a user friendly interface for the Soundscape environment with large text and a colorful screen. Since it is public domain, users can pass the program on to friends, but this also means that Mimetics will not provide technical support or updates for the program. The only bug I've come across is some difficulty in displaying the letter "V" in the track names. Fast Tracker is not a module but a program that starts Soundscape when it is run. As a front end it supplies all the basic sequencers necessities in a simpler format for the first time user. Available are 16 tracks which can be set for play through MIDI or the Sound Sampler, or record or mute. Six segment LED meters for each track light up when the music is played or recorded. Controls are given for clock resolution, beats per measure, beat resolution, metronome on/off, lead in count on/off, quantize resolution, and beats per minute. Some familiar though oversized tape transport controls and a measure/beat display round out the features. Fast Tracker is so easy to use that even seasoned Soundscape windowing experts may decide to exploit it for basic recording. At any time the Fast Tracker screen can be flipped behind the Workbench screen to manipulate the Soundscape windows in their pure form. By using Fast Tracker no capability is given up, only the same 70K of RAM that the program occupies.

Another Soundscape module in the public domain is Crossfade, available on AMICUS disk 26, and probably in your local users group club library. Crossfade works with the Mimetics Sound Sampler to modify samples for smoother loops. To use it, you must open the Sample Capture & Edit window of the sample and select the crossfade icon from the Patch Panel. The Crossfade window lets you select channel and octave. Since crossfade actually modifies the sampled sound file, an undo button is available for any unwanted results. Crossfade works by mixing the sound within the loop decaying from 100% to 0% amplitude with a reversed version of the loop increasing from 0% to 100% amplitude. As a result, by the time the crossfade loop reaches the end, the timbre is the same as the beginning and no annoying glitches are heard. While crossfade generates some tremolo in the resulting sample, the improved loop is usually worth it. Don't forget that once you've done a crossfade the sample can never be relooped, so saving the original is always a good idea.

Now for some words on Soundscape's overall performance using the new modules. After installing some extra modules on the Patch Panel, the icons become cramped for space. Fortunately, stretching the Patch Panel to the full screen height also spreads the icons a comfortable distance apart. One operational inconsistency is in the way Soundscape saves files. You can save each type individually, with different names for each, or enmass with the save environment command, but still with different

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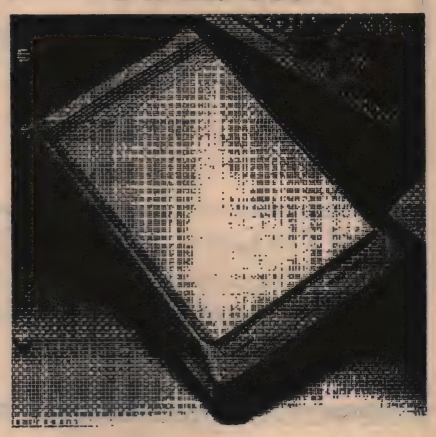

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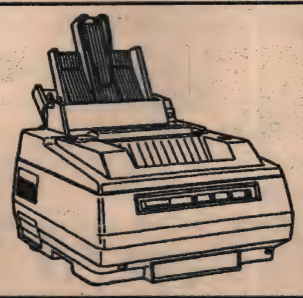

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ZOOM!—New Arcade Game For Amiga

Discovery Software has announced the release of its second arcade-style game for the Commodore Amiga computer: ZOOM!

ZOOM! is the computer industry's latest, greatest chase maze game. Set on a plane of competition which is hurtling through hyper-space, ZOOM! is delightfully easy to learn and pleasingly non-violent. At the same time, it offers fascinating (or, depending on your viewpoint, excruciating) competition.

"This game is so much fun, you'd put quarters in your computer to play it," says Discovery Software President Rick Ross. "Anybody can learn to play ZOOM! in five minutes, but some of our best game programmers haven't been able to advance past level 12—and it's a 50-level game."

The key to ZOOM!'s charm is what the Discovery programmers have come to call the oops factor. As Ross explains it, "The game is almost seductive. Just when you think you're about to break into the next level...Oops! It's enough to drive you crazy—and to keep coming back for more."

ZOOM! was expected to ship in April. Discovery Software's first arcade game for the Amiga, ARKANOID, was released in December, 1987.

For further information, please contact Discovery Software, 163 Conduit Street, Annapolis, MD 21401; (301) 268-9877. ●

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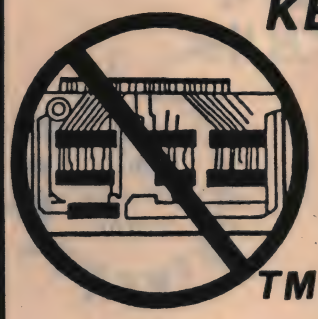

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Soundscape Utilities
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file names for each file type. The problems start occurring when in a recording session you save your track, mapper/splitter and sysex data under different names than your environment, then modify that data. If you do another save environment, a requester allows you to change its name, but not the names of the other files. All of your data files except environment will be overwritten whether you like it or not. The only solution is to save each file type individually, except environment, which shouldn't be saved at all after the first time. Mimetics is aware of this quirk, but didn't seem certain it would cause problems with users. My opinion is anything that creates the potential for lost files is dangerous, and should be corrected.

Another quirk is in the selection of input and output icons in the Tape Deck, MIDI Mixer, MIDI Mapper/Splitter, and some other modules. Your choices are displayed one by one as you click the left mouse button, including all icons in the panel, even those which can't pass data through module, such as SystemX or Crossfade. Nothing happens if you pick an incompatible module, so it's more of an annoyance than anything else.

Installing the modules temporarily or permanently is simple, but arranging your entire sequencing system on disks is not. In the Utilities 1 manual, Mimetics recommends creating a different Workbench disk for each project and using it for data storage as well—a most preposterous suggestion. Soundscape requires the file "soundscape.library" (a 145K program) in the libs directory of your Workbench disk. If you also add the modules from Utilities 1 (5-20K each, except Fast Tracker at 68K) in a new directory, and delete unnecessary files from Workbench such as extra printer drivers, keymaps, fonts and utilities, you'll still have less than 15% of the disk free, or about 120K of disk space. A single sample file or set of sysex files can consume most of that. A more workable solution is to make a copy of your Soundscape 1.4 disk using Marauder II, with Brian File 008, and put your original in a safe place where it belongs. Maruader II deprotects Soundscape so that you can delete all of the data files (tracks, samples, and environments) from that disk, but not

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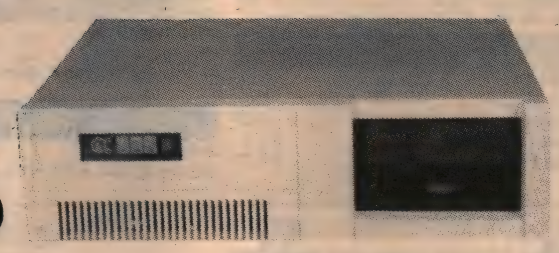

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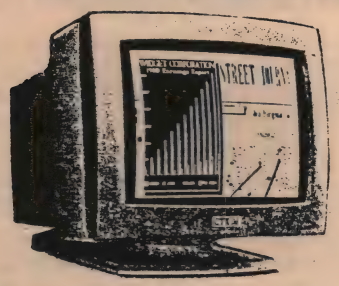

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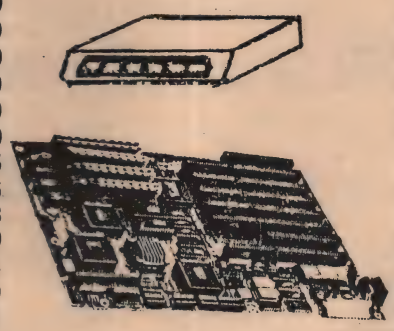

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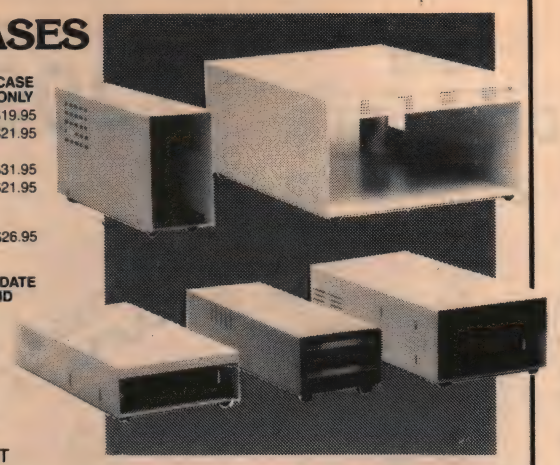

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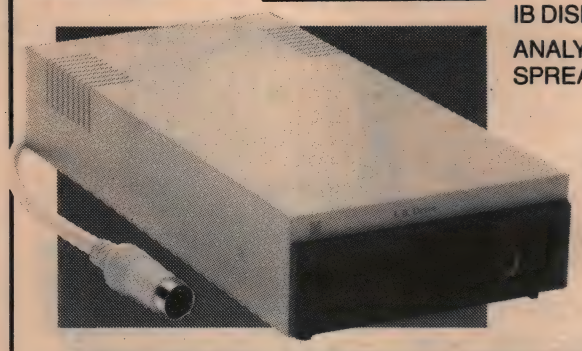

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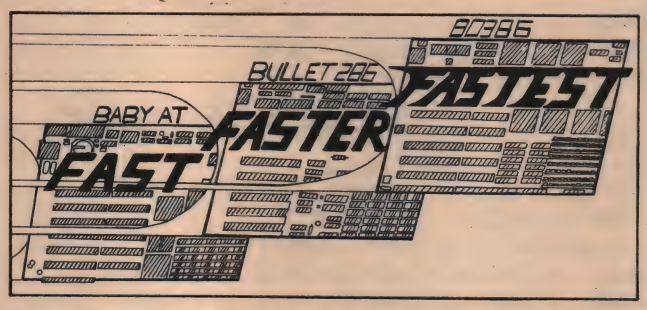

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Learning To Type With IntelliType

Electronic Arts recently introduced IntelliType for the Amiga computer system. IntelliType, designed by Moses Ma, is the typing tutor program for adults that uses sophisticated artificial intelligence and an exciting adventure story to teach typing in just one month.

"With the increased use of computers, typing skills are more important now than ever," noted Stewart Bonn, vice president of Electronic Arts' Creativity Division. "So we've created a typing tutor program with advanced learning technology and artificial intelligence to help people learn or improve touch-typing. But the technology doesn't matter if people don't finish the lessons—and that's why we put in an exciting adventure story."

With IntelliType, users are enticed to go to the next lesson because it's another cliffhanger episode in an action-packed thriller. There are death-defying stunts, sizzling sensuality, careening car chases, witty banter, and a storyline that is never boring. The story follows the adventures of Ted and Laura as they deal with international agents, industrial spies, and a secret formula that could change the world. "Imagine a story that's a mixture of *Soap* (the television show) and a James Bond film—you never know what's going to happen next," noted Bonn.

There is more to IntelliType than the story. Users take one daily lesson of approximately 45 minutes apiece for 30 days to improve their typing skills. (The lesson plan can be lengthened for people with less regular schedules). IntelliType offers customized instruction to maximize typing skill and minimize learning time. Users can choose to emphasize speed, accuracy, or both when beginning the course.

Then IntelliType sets goals for learning progress based on the initial skills, and the selected emphasis of the user. As lessons are completed, IntelliType diagnoses the unique habits of the user and prescribes special drills to address

continued on page 371

Soundscape Utilities continued from page 368

relocate the Soundscape bootup program elsewhere. Basically, all you need are the ss directory contents, the soundscape and smusconvert2.0 files and their associated icons (.info files), and a hidden file, the name of which prints as blanks. With the data files gone, the disk is 95% empty, and ready for the storage of your own data. The disk can now be copied using the operating system's diskcopy to create multiple data disks. You may also wish to place occasionally used modules in a directory on the Soundscape disk, as the Workbench gets filled quickly, and Mimetics has announced a whole slew of modules.

There have been reports that you can run Electronic Arts' Deluxe Music Construction Set through Soundscape as a module. This is indeed true, though the procedure for doing it is not documented anywhere. Opening Soundscape as usual, insert your DMCS disk, and load the program. Make the DMCS MIDI active, and you get a message to the effect that Deluxe Music Construction Set is now running through Soundscape in place of Soundscape's MIDI inputs and outputs. DMCS will now be represented on the Patch Panel as a red circle with a white outer ring. To record from DMCS to Soundscape, patch DMCS to the Tape Deck and create the necessary tracks and input assignments. Start the tape deck recording, then go to the DMCS screen and begin playback. The advantage of this direct link from DMCS to Soundscape, rather than using SMUS files to transfer musical data, is that parameters such as velocity, program change numbers, and play style are not lost. In this case, only the Soundscape MIDI input is stolen, so setting the tracks to record thru will send the data out to your synthesizers. To record from Soundscape to DMCS, patch the Tape Deck to DMCS and create a staff in DMCS with the desired MIDI input channel, and enable MIDI input. Go back to the Tape Deck, setting that track to play thru, and set a slow clock rate in the range from 5 to 10 clocks per second, since DMCS does not allow real time MIDI input. Getting the Soundscape clock and DMCS MIDI delay to match is a painstaking task often giving inconsistent results. Don't forget to patch the Tape Deck input to DMCS as your Tape Deck output. Now when you start the Tape Deck playback, DMCS will automatically record the track. The advantage here is that you can get nearly immediate graphical feedback of your MIDI tracks. Since DMCS cannot record rests or simultaneous MIDI channels, the usefulness of the link in this direction is limited.

Like the original Pro MIDI Studio, Soundscape Utilities 1 is an excellent value. It gives features like the Mapper/Splitter that are simply unheard of on other sequencers. Depending on your applications, some of the modules may become a regular part of your MIDI setup, such as the Clock Scaler for synchronizing external equipment, while others such as SystemX are essential for any application. If you already own Pro MIDI Studio then the Utilities are indispensable, and if not they make a good case for making Pro MIDI Studio your sequencing system of choice.

Though Utilities 1 is not copy protected, the Soundscape Pro MIDI System 1.4 required to use it is. 512K RAM, MIDI interface and MIDI equipment are required. Price is $49.95, and may be obtained from Mimetics Corporation, PO Box 1560, Cupertino, CA 95015, 408-741-0117. AMICUS disk 26 is available for $7.00 from PiM Publications, Inc., PO Box 869, Fall River, MA 02722. ●

Updates
continued from page 214

"useful for impressing naive women at cocktail parties—but otherwise essentially useless." I would hate to think he's implying all programmers are male. He continues: "Unless its imprecise and ambiguous usage ceases, RISC will, like most technical terms appropriated by idiomatic speech, become totally meaningless."

Anyone who's studied the evolution of RISC schematics knows its inspiration is far from idiomatic. Therefore Kuechmann's RISC definition list—and subsequently Schenken's—should have been verified before it was taken to be truth.

RISC architecture is a serious experiment which raises heated debates in business conferences, not parties. The RISC proponents claim that by reducing chip mnemonics to the most basic logical terms—although more terms would be necessary to accomplish the same operations as before—more expedient throughput will be the natural result. RISC's opponents, the standard-bearers for Complex Instruction Set Computers, claim the expense in programmer time will more than compensate for that speed increase. Besides, say the CISC proponents, complex microcoded instructions (like mathematical division instructions) running at speeds above 20 MHz will always be faster. Competition like this leads to technological advances on both sides of the equation.

Inmos' Transputer is generally considered a RISC-architecture machine, with only three registers per node and inflexible "fixed-format" instructions; though some of its instructions are microcoded, or have their own internal "operations manual" etched in for some instructions.

About the use of SRAMs: I evidently made a statement which did end up sounding confusing. "Static RAM," I said, "isn't meant to contain data for sustained intervals." For the sake of instruction pre-fetching by the Transputer, SRAMs certainly aren't meant for sustained interval storage but for fast addressing. Schenken points out SRAMs are "frequently used for long-term storage in battery-backed applications." SRAMs, because they are static arrays, do not require the constant refreshing that dynamic RAMs require. SRAMs retain their stored value until they are reset or the power is shut down; but because of their architecture, their 40 ns access time (Inmos uses 18 ns SRAMs) makes them attractive for use in very short-duration storage.

Mr. Schenken has a passion for attempting to correct terminology. For instance, states Schenken, "binarily" isn't supposedly a word (but you know what it means); hypercubes are only applicable in the fourth dimension (see *Computer Design*, 1 June 1987, page 68, for a diagram of hypercubes from zero to four dimensions); and quite curiously, "vector processing" has nothing to do with co-processing. Schenken proceeds to quote a six-year-old Scientific American article on the architecture of the Cray 1 supercomputer (superseded twice since by the Cray 2 and X-MP) and applies Cray's

continued on page 372

Learning To Type
continued from page 370

specific problems. No time is wasted on unnecessary drills.

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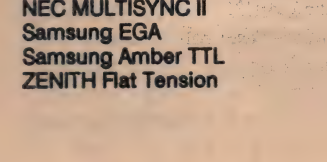

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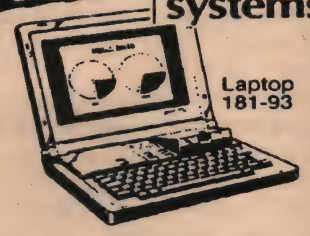

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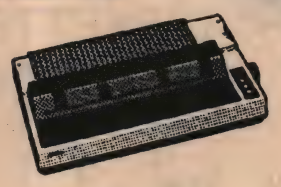

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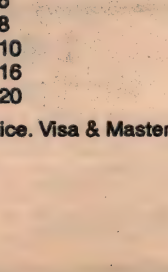

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Updates continued from page 371

philosophy to Inmos' architecture—which would resemble Oral Roberts preaching to Lao Tzu. That article uses, correctly, the term "vector operation" synonomously with "co-processing operation."

Schenken was evidently confused by the whole matter of vectorization—the CPU's method of delegating certain portions of the processing task to a simultaneous co-processor or, in the case of parallel processing, to multiple processing nodes as in a Transputer. Writes Schenken, "If your income, your taxes, and your take-home pay were to be doubled (by calculation), one Transputer node would be assigned the task for your income, another for your taxes, and a third for your take-home pay. Not as co-processors, but as three independent computers solving three independent problems."

The delegation of tasks in parallel processing is not at all that simple to explain. How would any computer be able to isolate and interpret the humanistic concepts of taxes and take-home pay? All the computer "understands" is the formula you've given it, which it breaks down into a sequence of logical operations. If you were to watch the process of catabolism of an algebraic formula into a logical formula on paper, you would see a tree-like structure in which the formula branches and divides to become logic. A multitude of logical branches might stem from one formulamatic root; such a cluster may be vectored—delegated to a separate node. The cluster may be related to just taxes, or to income and take-home pay. Just what cluster is vectored where depends partly upon the particular circumstances in which the formula was invoked—which we wouldn't have enough space to describe if we had the entire *Computer Shopper* open to us.

Yet Schenken concludes: "Solving this problem is entirely sequential, each step fully dependent on the previous one; the Transputer would not be able to run any faster no matter how many nodes were available." All logic is sequential—in fact, the use of Boolean operators makes it more sequential; but that doesn't mean integral portions of that sequence cannot be executed simultaneously.

Aside from that point, it seems to me Mr. Schenken has read very little on the subject outside of *Scientific American* and *Byte*. Schenken goes so far as to say in the close of his letter, "Please, take off the rose-colored glasses and read *Byte*. You need a realistic outlook, more computer education (or better writing skills, I can't tell which), and better research to inform you of what's going on."

A little more research would've been to Schenken's benefit, for his conclusions about how a parallel processor distributes its tasks may be how Andrew Tobias works, but not a Ridge or a Transputer. His conclusions seem to be based upon assumption and guesswork; even *Byte* would know better than to misinform him that severely about co-processing.

Yet *Byte*, quite honestly, is not the repository of all the information ever published about technology. It can't even really be considered a microcosm of all there is to know about parallel processing or RISC or static arrays, because it's simply too small a vessel to contain even an abstract of it. To tell a professional technical writer to wake up and read *Byte* is like imploring a UN ambassador to wake up and read *Time*. Research is important, but one must also have first-hand experience.

That is why I seek interviews with engineers and decision-makers—not to act as a paid political spokesman for Atari as Schenken implies, but because D. F. Scott alone is not enough. The public deserves more than a recitation of what one person thinks he knows; it needs verification.

"Trust But Verify" Re-examined

Which brings us to the question of Atari, the corporation. At the end of my Outlook article on the Abaq last January, I closed with this paragraph: "This is a time for the Atari enthusiast not to be passive, sit back, and gripe about all the unfulfilled Atari promises, and all the projects which never culminated into something that would make the old technology a nanosecond or two faster. This is a time for us to lend Atari our support. We must be the resolute ones. After all, we're all the advertising Atari has."

That provoked this response from Delphi Group Atari member Richard Hall (username PAWN): "I am still upset by the fact that you say we should give Atari our support and not gripe about their shortcomings. I have given Atari my support for the last two and a half years—and I would like to start to get a little back.

"I like my ST very much and would not trade it, but it infuriates me when I talk to companies like Jefferson Software and Computer Tools International (both of whom are involved with the IDRIS OS) and they tell me how idiotic Atari is being—Maybe Atari has other things on their minds, but it seems unwise to start on something as major as IDRIS and then just forget about it."

By now, I'm sure Mr. Hall has read the February and March issues of the *Computer Shopper*, which included my Outlook series on IDRIS, as well as Atari's press release concerning how it intends to market the product. Since then, Atari may indeed have dropped plans to market IDRIS for Computer Tools; but due to the reorganization of Atari's Public Relations division, this story is unconfirmable at press time. Has Atari forgotten the interests of its computers' users? I have what I feel will be an unorthodox response:

So what if they have? As long as the ST is still made available, and as long as it is profitable for companies to support that machine, Atari will have done for us all that it needs to. I don't think I need a blitter right away. My livelihood won't be threatened if the PC-emulation cartridge never makes it out of the labs. The Abaq will be a fine machine; but if Atari doesn't distribute it, someone else will. Atari

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Computer Book List continued from page 221

Enable, Version 2.0. Also available is *Mastering Enable*, Vers. 2.0. By: Bishop, Price: $22.95.

Publishing Power With Ventura
Martha Lubow and Jesse Berst
New Riders
$24.95
Copyright: 1988

A comprehensive, hands on tutorial for desktop publishing which provides step-by-step techniques for creating newsletters, marketing materials, corporate reports, directories and more. If you are using Ventura at the moment, this is an ideal book to increase your productivity and will show you how to use Ventura to integrate graphics with text from word processing software and how to master Ventura's style sheets to get better documents faster.

This is a truly good book which should be on the shelf alongside the best seller *Inside Xerox Ventura Publisher*. Both books are superb as intro. and advanced texts for using the Xerox Ventura Desktop Publishing program.

***Inside AutoCAD* Revised to cover Release 9**
Raker & Rice
New Riders Publishing
$34.95
Pages: 309
Copyright: 1986

Raker and Rice tell the inside story of how to use AutoCAD and they give a "hands-on" feel for the program. Contents include Setting Up AutoCAD, Getting Around, Graphics Primitives, Introduction to Editing, Drawing Enhancements and much, much more. An easy step-by-step introduction with over 300 drawings explaining the use of AutoCAD and handy references for setting up the program for professional drafting and design work. Ensuing titles, more advanced and more technical than the above is *AutoCAD Productivity Book* (Ventana Press) [$39.95] and from Sybex *Mastering AutoCAD* [$29.95]. Also covering Rel. 9 is *Customizing AutoCAD* $34.95. (Software available $29.90).

Mastering Dac Easy
Mosich & Chamberlain
Scott Foresman
$19.95
Pages: 442
Copyright: 1987

This book which covers version 2, has been selling steadily to small business for instruction on using this very versatile and affordable accounting package. *Mastering Dac Easy* covers all Dac-Easy accounting as well as payroll modules thoroughly, provide terminology and fundamentals needed to install, operate and maintain payroll records, accounts receivable and the rest of your accounting system. A good, solid book—covering this package.

Advanced Turbo C
Schildt
McGraw-Hill
$22.95
Pages: 325
Copyright: 1987

For using Borland's new Turbo C compiler, this is an excellent book for the programmer already familiar with Turbo C. [*Using Turbo C* ($19.95) for a less technical introduction.] The book thoroughly covers searching, stacking, queues. Also discussed is converting Turbo Pascal to Turbo C. This series has been published under the auspices of Borland.

Inside Xerox Ventura Publisher
Cavuoto & Berst
MicroPublishing/New Riders Publishing
$19.95
Pages: 328
Copyright: 1987

Xerox Corporation's *Ventura Publisher* has been at the top of many of the best selling lists of desktop publishing software. *Inside Xerox Ventura Publisher*, is an excellent book showing how to create your own style sheets, how to scan images into documents and how to use the pre-formatted approach. Contains tips on producing color separations. Also available are Document Gallery Sheets—8 Style sheets (software)—[$39.95 each]. Complete sets of style sheets consisting of: Newsletters, Technical Documents, Marketing Collection, Book Collection, Directory and Corporate Collection. [Complete Gallery-$249.95]

Managing Your Hard Disk
Berliner
QUE
$19.95
Pages: 559
Copyright: 1987

Easy to understand instructions show you how to use programs that usually won't run on hard disks, activate menu programs, back up data, store and

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Computer Book List
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retrieve libraries of information. A similar book *Hard Disk Software Management* [$21.00 Management Information Source].

Brady Guide To Microcomputer Trouble Shooting And Repair
Beechold
Brady
$17.95
Copyright: 1987

The only thing worse than having problems with your computer is trying to get them fixed!! This book should help in doing just that—or better—it will help prevent disaster in the first place! Clear and concise, and with a "twinge" of humour, this is a non-technical, highly useful resource for most of us who still wonder what the application programs are all about, let alone the how to repair these "time saving devices"(!).

Complete HyperCard Handbook
Danny Goodman
Bantam
$29.95
Pages: 720
Copyright: 1987

"An incredible programming tool..." is what reviewers are saying about APPLES' HyperCard for the Macintosh. This book shows most shortcuts and features about HyperCard browsing, graphics and authoring. The second half of this book, leads into a comprehensive discussion of HyperCards programming language, HyperTalk. [Also, due out shortly from SAMS, is *HyperTalk: A Programmers' Guide.]*

Clipper Connection—To dBase III Plus
Goldenthal
WSI
$424.95
Pages: 515
Copyright: 1988

The second book out there after, *Programming In Clipper*, by Straley, [$29.95], this book will most likely find a niche for itself. Numerous tricks, tips and explanations are included. User defined functions in assembly and C language in both direct and on-line format are explained.

A slgihtly annoying feature is the appearance of the authors' copyright notice almost almost every page of code in the book. In all honesty one must ask oneself for an amount of copyright notices, or am I paying for information? Either way, this book does deserve some serious consideration.

Build Your Own 80286 Compatible And Save A Bundle
Aubrey Pilgrim
Tab Books
$16.95
Pages: 198
Copyright: 1988

With the astounding success of the authors' first book *Build Your Own IBM Compatible And Save*, it was only natural that the 80286 book should follow. This book has many distinct improvements over the previous 8086 book, the illustrations, though not perfect in quality, are much better. The value of a book like this, of course, is the close up illustrations and sources of supply. A lot of extra information is included, which I did not expect to find in a book on system construction. If you are the do-it-yourself type, have

continued on page 376

Updates
continued from page 372

has done everything it needs to for my sake.

We spend a lot of time complaining about what Atari hasn't done for us. We rarely stop to ponder what we've done for Atari. There are dealers, distributors, and developers whose jobs and well-being were damaged by the lack of activity from Atari in the US in 1987. It is repairable damage, but nonetheless unnecessary.

But just how is the ST user, the consumer, damaged if Atari delays all its ST developments indefinitely? This is the person who's plunked down a mere thousand bucks for the best computer raw ingenuity ever developed. If we take the profit Atari made from that thousand bucks and distributed it evenly amongst each Atari employee, the consumer may have just barely bought them all lunch at Burger King; in return, we expect 68030 UNIX boxes hand-delivered to our doorstep.

A single good comment about the ST made in public could be more valuable to Atari than even a purchase. If you must, leave out all references to the Tramiels or to Atari employees-focus upon the brilliance of the machine. There will be superior machines; but for the past two and a half years, the verb has been "will be," not "are." With such amazing endurance against such considerable controversy, the machine must have something very good going for it: solid technology and solid user support.

Talk Back!

As I stated in the beginning of this article, *Computer Shopper* is establishing new and more expedient channels for reader response. There are now two *Computer Shopper* telecommunications services: the *Computer Shopper* RoundTable on GEnie, and the *Computer Shopper* Information Exchange (C*SIX) on Delphi. Both give you the capability of responding to, or speaking directly with, *Computer Shopper's* editors, staff, and writers.

You can find me on C*SIX almost any day of the week; my Delphi username is DFSCOTT. You can ask me questions ranging in scope from "Is Borland gaining an edge on Microsoft?" to "What are the benefits of CISC technology?" to "Who are you, D. F. Scott?"

Don't be surprised if your questions turn up in print. We're taking donations of rose-colored glasses from all of you who are still wearing them even after reading *Byte*. Hope to see you online. ●

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Computer Book List
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a couple of screwdrivers and pliers then with this book and your trusty charge card (and *Computer Shopper*, of course!!) you are on your way to upgrading to an AT!!

dBase III Plus: Complete Reference
Carrabis
McGraw-Hill
$22.95
Pages: 744
Copyright: 1987

Where many books give a "how to" approach, including books mentioned in this column, *dBase III Plus: The Complete Reference,* gives a thorough and very comprehensive coverage of every command, function and feature, including syntax, in a very handy format. The average coverage is 1.5 to 2 pages of text per command/function. Specific examples are given where the author has deemed it necessary. Especially useful to be able to reach out, flip to the command needed and back on the shelf it goes! Other titles in this series are, *C, TCR* [$24.95]; *1-2-3 TCR* [$22.95] and *DOS, TCR* [$24.95].

***Word Processing Power With Microsoft Word* (2nd Ed.)**
Peter Rinearson
Microsoft Press
$19.95
Pages: 411
Copyright: 1986

This book has been widely heralded as "the best" book on this subject. [Note: "Best" is relative to the experience the reader/user has.] Now, it has been updated and thoroughly revised to include all the features of every version including the major advances of Word 3.0 and 3.1.

***HyperTalk Programming* Includes V1.1**

Dan Shaefer
Hayden Books
$24.95
Pages: 546
Copyright: 1988

"The HyperTalk programming book for the rest of us..." This first comprehensive guidebook to focus exclusively on the new Hypertalk language, built into HyperCard. Highlights include the creation and incorporation of language extensions using XCMD and XFCN; details on using external commands in Pascal and C. Also includes two complete scripts for ready made applications.

Advanced Techniques In dBase III Plus

Alan Simpson
SYBEX
$22.95
Pages: 500
Copyright: 1986

One of the best choices for the experienced dBase programmer. This book explains database design, program design and structured programming to Plus users. The primary focus is on developing user friendly, customized programs and the examples cover many aspects of different business solutions, including inventory and accounting systems. Simpson has become one of the most popular dBase authors and has a consistent presence on best seller charts.

IBM PC & Macintosh Networking

Stephen Michel
Hayden
$21.95
Pages: 296
Copyright: 1988

With Big Blue established in the corporate world and the Mac making a serious challenge into that market, it makes only sense that sooner or later the twain shall meet! And then...?? And then...you have a book like this to help you through the maze!! The author discusses two software/hardware product combinations that allow the PC and Mac to be networked (TOPS/Appleshare/Appleshare PC). A worthwhile book for those in this situation.

****

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Secrets Of The Adam
continued from page 258

LOMEM and HIMEM commands for further information.

Music! Music! Music!

Adam lovers! Can't find the commands to make sounds with your computer? Don't look any futher—there are none listed in the manuals as there are No commands for sounds! For sounds and music on the Adam, we have to input a Z80 assembly routine. The "routine" is contained in the following program listed. Type in the following program to get the assembly routine ready for your music programs. {In the following program, LOMEM is a command!} Elementary instructions on the operation of the routine and how to get some musical notes follow.

```
100 LOMEM: 27420: FOR I%=27410 to 27415:
READ J%: POKE I%,J%:
    NEXT
110 DATA 58,24,107,211,255,201
```

What is this program going to do to my computer? The LOMEM: 27420 command sets the lowest memory address that the computer can use for a BASIC program to 27420 instead of the 27407 it has upon loading. We will use the addresses from 27410 to 27415 for our assembly language routine that will operate the sound channels within Adam. Address 27416 will be used for storing the note to be played.

The notes for your sound will be poked into address 27416. You'll use CALL 27410 to produce the sound. The following lines will produce the sound of the note you assign to the variable "Z."

```
65000 P=359700/(32*Z: POKE 27416,128: CALL
  27410: POKE 27416,P: CALL 27410: POKE
  27416,144: CALL 27410
65010 FOR DELAY=1 TO X: NEXT DELAY: POKE
  27416,159: CALL 27410: RETURN
```

** Notice: variable P is poked into the address, not your variable Z! In line 65000 the variable P is calculated to be poked into the address.**

The variable "X" {in line 65010} is the time you want the note to play in milliseconds. Roughly a quarter note is equal to about 250 milliseconds. Now, don't go and quote me on that! You know that music has different tempos! So, you'll just have to listen to your tune a few times to adjust the duration of the notes {via variable X}. What are the notes? Listed below are the major ones:

{# = sharps.}

```
Low.....#....Middle....#....High....#
C..131....139....262.....277...523....555
D..147....156....294.....311...587....622
E..165....180....330.....340...659....679
F..175....185....349.....370...699....740
G..196....208....392.....415...784....831
A..220....233....440.....466...880....932
B..247....255....494.....509...984.......
```

These notes should be enough to get you started with most musical pieces and most popular music can be translated and used on your Adam with the above list. Before you are satisfied, no doubt, the list will not only have grown, but will be modified to suit your taste.

What we want to do now, is look at the possibility of using all 3 of the voices that come with the Adam! We can use the same from program above to do this, but we have to modify it just a little. Nothing major, now, so don't panic. I'll step you through it.

Notice that we have to POKE 128 into the address, CALL the machine code routine, POKE in the note, CALL the address, POKE 144 in, CALL the address and the sound comes out. We have a delay for the duration of the note, then we POKE 159 in and CALL the address. Whew! We have voice #1. All of this takes only a fraction of a second. See the chart below for the "turn-on" and turnoff" values for each voice.

	Turn-on	Turnoff
Voice #1....	144.....	159
Voice #2....	176.....	191
Voice #3....	208.....	223

Now, instead of just using 144 {the third poke} and 159 {the last poke}, if we use a variable and assign 144, 176, or 203 to it, prior to the GOSUB to the routine in line 65000, we can use voices #1, #2, and/or #3! Modify line 65000 as shown below. Before you GOSUB to 65000 you will need to assign variable 0% with either 128, 144, 176, or 208. [i.e. 0% = 208].

{In line 65000 above change the POKE 27416,128 to POKE 27416,0% per below.}

```
65000 P=359700/(32*Z): POKE 27416,128: CALL
27410: POKE
  27416,P: CALL 27410: POKE 27416,0%: CALL
27410: RETURN
```

Change it here.....^ ^ .... ^ ^ ^

You will need to modify line 65010 as follows:

```
65010 FOR DEALY=1 TO X: NEXT DELAY: POKE
  27416,Q%
```

continued on page 378

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An Interview With Max Toy, President Of Commodore

by John Heilborn

"I started my career selling green beans," says Max Toy, president of Commodore Business Machines. "I was always fighting for shelf space when I was working for Del Monte, and I'm fighting for it again today."

But while putting green beans on a shelf was the start of Max Toy's career, it certainly is not his focus today. Like John Sculley, who began his career stacking Pepsi bottles in store displays, Max Toy is now heading up one of the largest microcomputer companies in the world. And like Sculley, whose company was founded by one of the microcomputing industry's "genius-eccentrics," Steve Jobs; Toy's company was founded by another "unorthodox genius," Jack Trameil. And since both of these founders have since founded new companies, you might think that Toy is spending a lot of his time looking over his shoulder. In fact, however, he is not.

"I'm not trying to sound coy, but Atari isn't my big concern right now. My biggest concern," says Toy, " is what I see in the mirror every morning. Our primary competitor is us. Commodore's success is dependent upon Commodore's ability to execute (its plans) regardless of who the competition might be; whether it is IBM, Apple or Atari. In fact, right now, I'm more concerned about Tandy and the Taiwanese clone makers."

And Max Toy should know. In 1975 he left Del Monte to join the electronics industry, selling typewriters, word processors and dictation equipment. He learned about marketing from one of the world's most powerful sales organizations, IBM. And he was one of the first men to be selected to go down to Boca Raton when IBM began work there on their third attempt to produce a personal computer—the IBM PC.

Actually, when he got his new assignment, no one around him was very impressed. His other associates patted him kindly on the back and said things like, "Gee that's nice Max...(ahem)." "It was kind of like getting a date with your sister," said Toy. "No one in my area really thought very much of what was happening down in Boca."

"But it wasn't too long," he continued, "before everyone I spoke with wanted to find a way to get assigned to our project. It was clear that we were doing something really different."

"For years IBM had been trying to "push" distributed data processing down through the MIS departments of their customers and had met with little success. In reality, the PC was sort of an end-run around the MIS department. And since much of IBM's strength was in the MIS departments, they were taking quite a risk."

IBM really liked the "cradle to grave" kind of approach that the PCs added to their product line and that is why they introduced it. In sharp contrast, microcomputerists tend to think that their products are both the beginning and the end of people's needs. That the "real" computer industry began in the 1970s with the introduction of Intel's first microprocessor, the 4004.

So of course, when IBM introduced their PC in the early '80s, the rest of the microcomputer world looked at that event as an acknowledgement, and, patting themselves on the back, said "see, we were right."

But that's not the whole picture. Toy has a story he tells, about a sales meeting

continued on page 379

Secrets Of The Adam
continued from page 377

Change it here..... ^ ^
Leave the rest of line 65010 the same as in the first example.

Of course, be sure to use the proper turnoff value! Stopping your program will not stop your tone! Be sure to turn off your tone(s) before stopping your program, else you will have to restart the program and shut them off. Or worse still, write the shut off then run it!

Also, before you GOSUB to 65000 you will need to assign variable Q% with either 159, 191, or 223 to turn off the voice you turned on. Be sure you turn off the same voice you used 0% to turn on!

Alright! We now have sound from either voice #1, #2, and/or #3! Let's go one step further. Volume of the voices can be controlled too. This is done by subtracting the value 1 to 15 from the turn-on value. The turn-offvalue remains the same. The value range is 15 [soft] to 1 [loud]. Different volumes can be assigned to each of the voices!

Example: Voice #1 loud, voice #2 medium and voice #3 low with note changed for each voice.

```
100 P=262: X=500: 0%=144-1: GOSUB 65000
110 P=330: 0%=176-8: GOSUB 65000
120 P=349: 0%=208-15: GOSUB 65000
130 FOR E%=1 TO 999: NEXT E%
140 Q%=159: GOSUB 65010
150 Q%=191: GOSUB 65010
160 Q%=223: GOSUB 65010
170 STOP
```

Your learning session will be to convert line 65000 so it will accept 3 variables, convert each variable, POKE each variable into 27416, then CALL the voice for sounds in each of the 3 voices. This is not necessarily the order for the process. Study line 65000, then modify it.

Try some music, graphic, and color combinations of your own.

Happy Adam computing. ●

SpeedTerm: Telecomputing For The 64 & 128

by D. Roderick Eamon

C-64 and 128 computerists are the most disadvantaged in telecommunications. The problem, is Commodore's Serial port—or User Port. While this port has the same input/output lines as a standard RS-232, however, connector and voltage differences make it incompatible with most modems on the market. To hook into these, your need a convertor to link your computer, (an interface for the interface)!

Commodorians can buy a Commodore-dedicated modem, or the RS-232 interface and an industry-standard modem. Those who see their Commodore as a stepping stone to more powerful computers should choose the latter, while confirmed 8-bit fans can choose either. So far, simple choices.

Most modems come with communications software to get the most from a telecom investment. Logic dictates that modem firms buy or develop usable software, tailored to match their product. This isn't always the case: Commodore support for standard RS-232 modems is virtually nil. For those owners, a large array of third-party software exists.

Okay, you've decided it's steam engine time: you are going online. Vast worlds exist to explore through your phone line. With your new modem you can call local bulletin boards, or go online with Delphi, the Source, GEnie, and any number of other computer networks. Tens-of-thousands of public domain programs are yours for the downloading from software databases.

continued on page 380

Interview Max Toy
continued from page 378

that was held at IBM's PC headquarters in Boca Raton one week...

"We were all taken to an office. Each of us was put through a security check and then lead to a large conference room where we sat around a long table and waited for Don Estridge to arrive. When he walked in, he told us that we had just had an incredible week. We had sold more PCs in that one week than IBM had ever expected to sell in the entire life of the product. We had had revenues of millions of dollars! The numbers he gave us were huge! So of course, we all adjusted our ties, patted ourselves on the back and felt pretty good as we settled back down in our chairs."

"And," continued Estridge, "the total revenues from the sales of your PCs wouldn't even pay the commissions for one of our larger main frames."

"Well you could just hear the air coming out of our little balloons," said Toy.

The microcomputer industry tends to think that it has shaken up the world. But in the United States, where we boast a market of nearly three hundred million, we haven't even got 10% penetration. Will microcomputers change the way we live? It looks likely, but it will take more than just vision and exciting products. People have to have a reason to buy computers and most of us still don't see any compelling need.

We've got our visionaries, we've got our electronic geniuses. But computers are not mystery boxes. They are appliances that solve problems. What the microcomputer industry needs now are super-marketeers. People who can look at the way we live and find ways for computers to make the impossible, possible. Max Toy is such a man. But he's got his work cut out for him. And while he may not be worried, he'd better keep his eye on his mirror, that is, after all, as good a way as any, to look over his own shoulder.

Got a question about computers? Send your letters to John Heilborn, P.O. Box 20102, Castro Valley, CA 94546. ●

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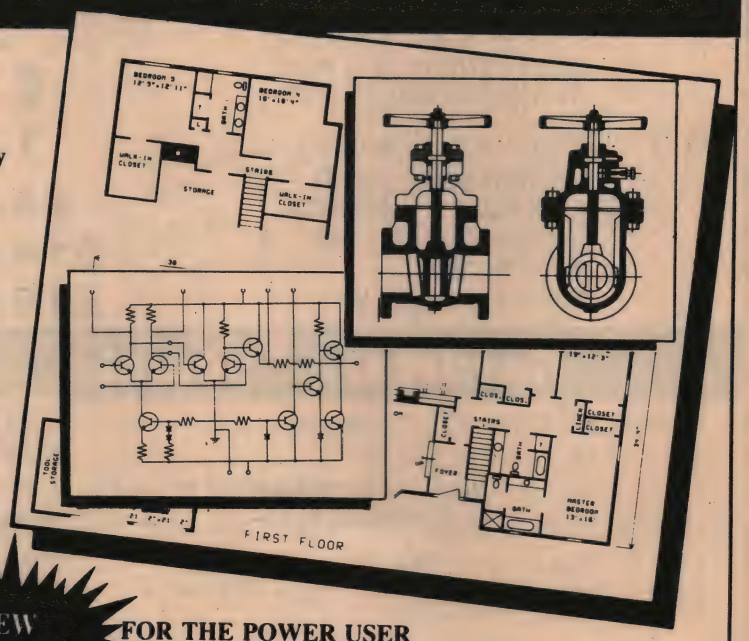

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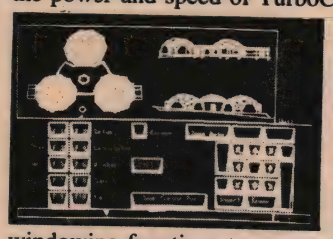

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SpeedTerm continued from page 379

Follow investments, transfer files to and from your office, or "upload" electronic letters to friends.

And—if you've written a great program, you can share it with the rest of the computer world—the above systems will happily add your creation to their ever-growing database. Online isn't static either: the capabilities of these services change and grow at an astounding rate.

For average needs, bundled programs perform most tasks well enough. Then it happens: a friend calls. "Are you Punter," she asks, "or X-Modem?"

These words sound familiar, if bewildering.

It gets worse. "Can you translate ASCII to PETASCII and emulate VT52? Can you receive user files?"

And worse yet. An important 32K session just went into your 20K buffer. A BBS you badly wish to access runs 7 bits, no stop bit, even parity, beyond your Simple Simon software's ability. Or your terminal program supports VT52 emulation but the manual didn't mention how to do it. The software doesn't support a second disk drive, so you can't format a disk without going offline.

This happens with simple telecomputing software. When your needs exceed the power of the software, it's time to step up to a full-featured telecommunications program. At the compushop, terminal programs by the gross stare at you from shelve space, each package proclaiming itself the best invention since the wheel. Most are adequate. One ranks high on my list—SpeedTerm, from Abacus Software.

SpeedTerm

System requirements: Commodore 64 or 128 computer, disk drive, modem, and formatted disk for downloading files.

SpeedTerm, a command-driven program, includes both a 40 column SpeedTerm 64 and 80 column SpeedTerm 128, and (not mentioned in the documentation) two bonus programs, Translator 64 and 128. We'll cover both Translators later; right now, let's look at the main programs, their advantages and disadvantages.

Getting Online The Hard Way

I had some initial problems with the package in 128 mode. After receiving the review copy, this 80 column program wouldn't load on my 1571 drive. It would begin to auto-Boot, but after the "Program loading" screen appeared, the drive gave up a grunt and hung up, its green light glowing. I tried every alternate loading method: no luck. Loading the 64 version with the 128 in 64 mode produced similar results.

Not the most promising start for a review. Every other program I use loads without a hitch on my 128. After a quick call to Abacus, a new disk arrived —and it wouldn't load either!

The 64 version loaded and ran flawlessly on my SX-64. Next, on a 1541, SpeedTerm 128 loaded. I also tried a 128-D: no problems. The glitch might be in drive ROMs or a slight head misalignment in my 1571, possibly aggravated by extensive copy protection. Or it may be the protection itself. I urge C-128 owners to shop where returns are permitted (if you can find one!). Many mail-order houses have liberal return policies, although most charge restocking fees.

To manage a successful load on a refusnik 1571 (DISCLAIMER: NEITHER I NOR *COMPUTER SHOPPER* WILL BE RESPONSIBLE FOR ANY DAMAGE OR HEAD MISALIGNMENT CAUSED BY USING THE FOLLOWING PROCEDURE!): Boot the disk normally and immediately after it hangs up, quickly jiggle the 1571's on/off switch. Occasionally, you'll hear more banging from your drive than the old 1541s make before it completes loading.

Features—Command Mode

Regular Commands: SpeedTerm 128 has all the features you would expect from a basic VT52 terminal emulator (the 64 version supports a partial emulation due to its 40 column screen), and much more.

The initial screen allows you to select from a number of modems. Here, support is excellent: everything from Commodore's 1600 VICMODEM to Hayes-compatibles. If you have a non-standard modem, you can try each selection—including "other"—to find the right one.

As stated earlier, SpeedTerm is a command-driven program. All setup operations are carried out through a large selection of short, typed commands. Protocols fully supported: X-Modem and Punter (with adjustable Punter Block size).

To ease your way into peaceful coexistence with SpeedTerm, a Help screen is as close as the "Help" key for 128s and either machine when the "?" is pressed outside Terminal mode. Available setup choices: screen colors, autodial, directory, linefeed toggle, 40/80 column Swapping, DOS mode, baud rate, RS-232 protocol (parity, stop bits, word length, and duplex), and Exit to BASIC.

Even down to checking remaining space, total buffer control is yours. An additional feature lets you "Extract" pieces of buffer data and copy them to disk in a separate file. This is a very nice feature to collect into files important data, and—when you've finished—discard the fluff. For the 64, SpeedTerm provides 24K of capture buffer, for the 128, 45K. Except for carriage returns, the buffer strips all control characters.

Single Letter Commands

SpeedTerm incorporates several one letter/one number commands to enter terminal mode, or to switch drives. "T" transports the user into termial mode. "L" does the same but with Local echo; "E" tells SpeedTerm to respond with full echo (i.e., transmit each key press to both your screen and the other terminal).

The number commands—"8" and "9"—select which drive you wish as a default drive. "?" pops SpeedTerm's Help menu onto the screen.

Once you leave Command Mode,

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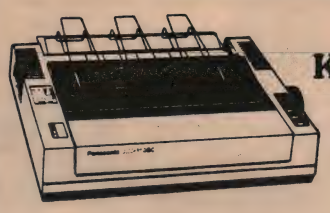

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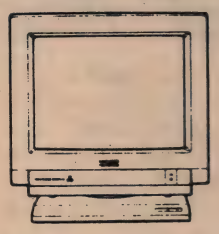

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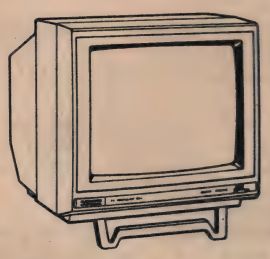

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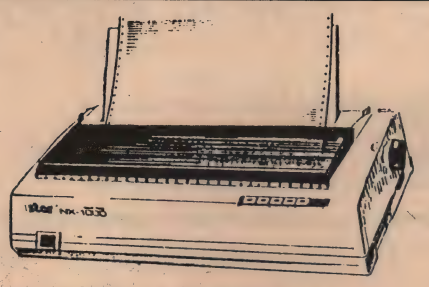

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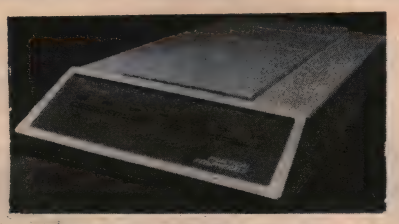

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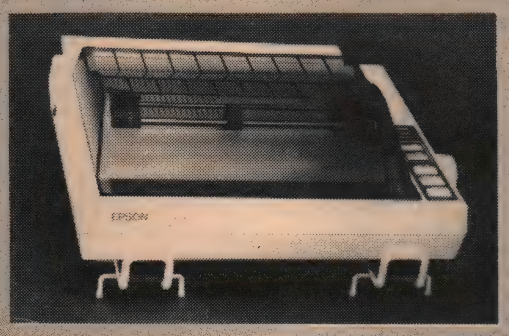

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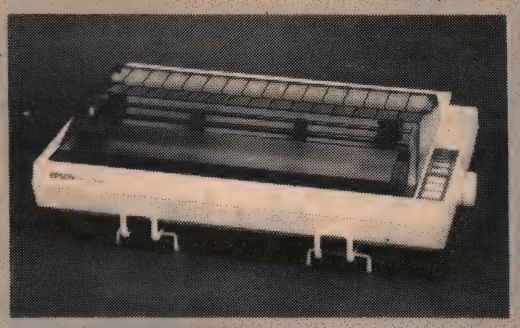

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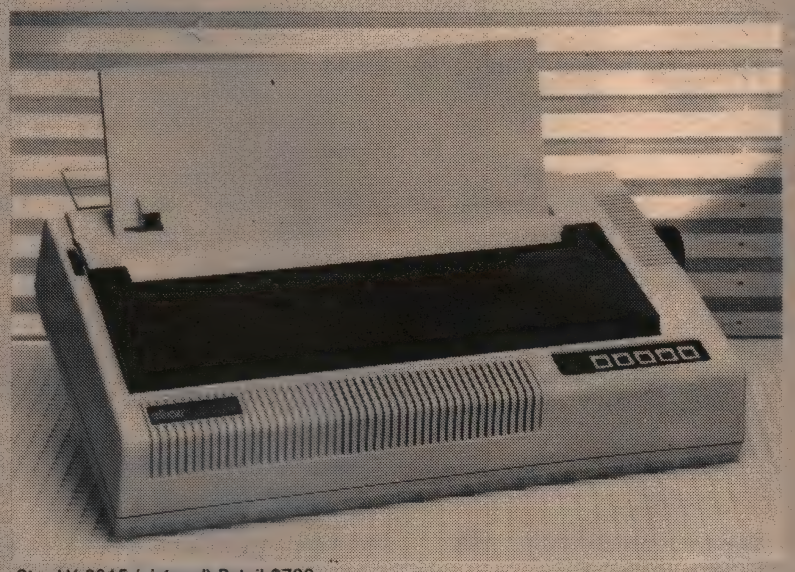

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Engine 64: A Diesel For The Commodore C-64

Reviewed by George M. Ewing

Engine 64 is one of a number of different hobby railroad programs that are advertised in the computer and railfan magazines. Versions of the "Engine" simulation program are also available for the IBM PC and Apple II families of machines, but I am basing this review on the Commodore C-64 version 2, which sells for $40.00 mail order from its distributor.

The program arrives on a single-sided 1541 disk, along with rather minimal documentation, namely a 14-page 5½"x6½" photocopied pamphlet with very fine print. Engine 64 allows the user to make up a simulated train of almost any length, with various combinations of locomotives and freight or passenger cars. The train can then be run on any of eleven prepared rail line routes, based on actual railroads. A hard copy record of the route can be printed out ahead of time, and a printed record of a given trip can also be recorded while the simulation is in progress, providing a permanent record of the "engineer's" performance.

A rudimentary editor also allows the user to modify any of the existing

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SpeedTerm
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none of the Regular or Single letter commands function.

Terminal Mode Commands

These two-stroke commands manipulate the capture buffer (open, close, erase, load, save, etc.), 40/80 column select, and exit-to-Command Mode holding the "C=" (Commodore) key and then pressng the appropriate Command key (ex., "C=" "/"b" displays buffer usage information).

Performance & Documentation

I tried every feature built into SpeedTerm in both the 64 and 128 versions. After my shakey beginnings, not once in the test period did this program let me down. It took a while to readjust to the new syntax, but every command is logically named. In fact, one needn't do more than quickly scan the Help menu or documentation to illuminate a function.

Which brings me to SpeedTerm's manual. As usual, Abacus waxed brightly in the printed word department. From introductory preface to thankfully complete index (I loathe manuals that omit or skimp on this all-important section), the SpeedTerm manual is concise and direct. If there is a shortcoming, it is the somewhat sparse glossary ("Echo," often referred to in the body of text and in the Help menu, isn't even defined). Here the doc could stand improvement, if only for tyros.

In general, the manual eases the user through a short learning curve, describing and then explaining each function and command as needed in a step-ladder approach. I appreciate this format: using the manual as a guide is simple and painless, even when online.

If you've ever downloaded word processor files from friends who own non-Commodore system and then tried to read them with a Commodore word processor, you've learned the difference between your machine's PETASCII and the industry-wide ASCII. Here, the two bonus programs—Translator 64 and 128—come to the rescue.

Both versions work as well as any conversion program—you'll have to reformat and strip carriage returns from document files originally created by straight ASCII word processors (C/PM, PC, etc.). They are slow, slower than GEOS' Text Grabber, for example. A 16K conversion took about four minutes to complete.

On the plus side, both Translators successfully converted a file that froze geoWriter. That ability is worth having on your side when the chips are down—you can first Translate and then feed to a sequential-reading word processor for cleanup. This facility is great for anyone who downloads a high volume of files.

Conclusion

On the strength of its ability to properly load and run on every computer but my own 128, I feel secure enough to recommend SpeedTerm, provided the vendor you deal with has a liberal return policy. SpeedTerm is at once a tightly woven, packed to the teeth telecommunications program and ASCII to PETASCII translator. Its support of both Punter and X-Modem protocol, and full VT52 emulation (in 128 mode) makes file transfers painless, and linking to computer database systems automatic.

Granted, SpeedTerm has a few failings: it can't save user-defined macros to disk, and it lacks a phone directory for often-used numbers—features that make life simpler. And then there was that loading lockup on my 128.

I give SpeedTerm the following rating with mixed emotions: I liked it enough to want it as my main telecomputing program, but I'm miserable with phone numbers. And its personality doesn't fit within the normal parameters by which we measure programs. It's not perfect, but very powerful; not flexible, but straightforward and solid.

Paradoxical? Yes, but without paradox, life would get boring, wouldn't it?

Out of a possible 10, I give SpeedTerm an 8.5.

At a suggested price of $39.95, SpeedTerm is available from Abacus Software, P.O. Box 7219, Grand Rapids, Michigan 49510; (616)241-5510, 9am-8pm, (EST). ●

Engine 64
continued from page 384

routes, or to make up a new one, although the process is rather tedious. The new route can be based on an existing stretch of real track, a famous historical line that no longer exists, or a completely imaginary railroad. (Real train freaks can indulge their childish fantasies by building an exact duplicate of a 1935 Burlington Zephyr, and taking it from Grandma's house straight to anyplace, with stops at Oz, Mordor, Chattanooga, Trantor, etc.)

The original distribution disk is supposed to be copy protected, (though most public domain copy programs will back it up) and the capacity of the disk is limited to about a dozen routes. If you want to do an extensive amount of editing or making up new routes, you'll have to erase some of the existing route files, or else copy the software to a new disk.

To run the simulation, the disk is loaded and booted with the convention LOAD "*",8 command, which brings up the main menu of five selections. These allow the user to: a) Run a passenger train, b) Run a freight train, c) Print a hard copy summary of any route on the disk, d) Either edit any existing route file on the disk or write a new one, and, e) Exit the program.

I'll describe the freight train simulation first, as it is more complex; the passenger train is really just a simplified subset of the same program. When the user selects the freight train in the main menu, this brings up a list of eleven possible routes. When one of these is selected, the user waits while the data for that route is loaded from the disk, and a summary of the route with track gradients, mileposts, speed limits, etc. is printed on the screen.

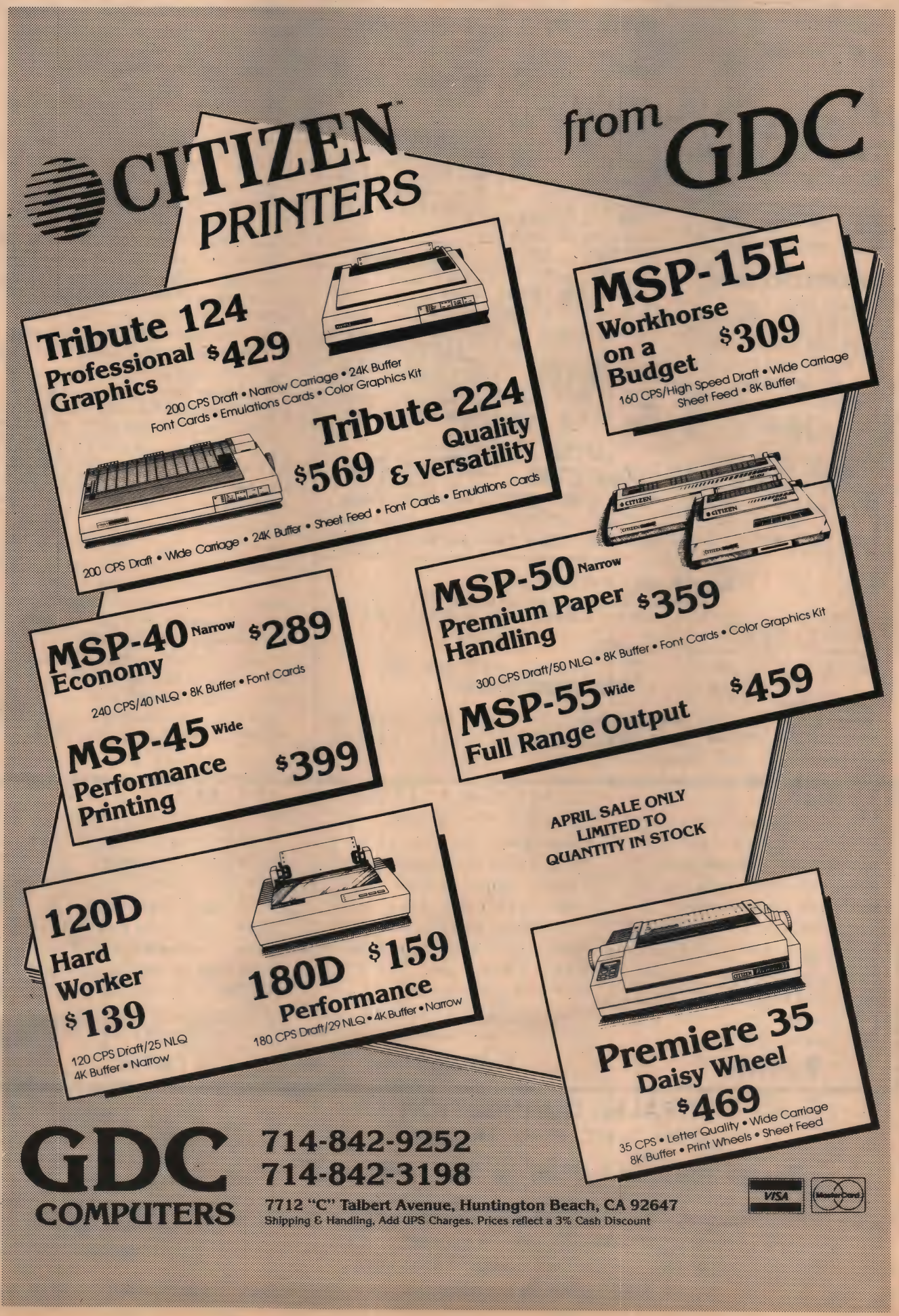
When the data is loaded, the user goes through a short dialogue with the program prompts, building his train by selecting the number and type of locomotives, and the total horsepower for both the head end units and any pushers or helpers, the number of cars for each 1/5 mile segment of the train, average weight in tons for the cars in each segment, etc. Like the train itself, the route is also divided into 1/5 mile segments: the user has the option of starting at the beginning of the route, or at any segment before the end of the route. This is very helpful; if you wreck your train on a particularly treacherous stretch of track, you can elect to run that segment over again, perhaps with a different braking or throttle strategy, or at a lower speed, without having to repeat a long boring stretch from the beginning.

As to the simulation itself, I have to give it a mixed review; in some ways it is excellent, and in some others it is rather disappointing. On the good side, the technical features are very detailed, and will gladden the heart of any railfan. The program keeps track of the various factors in minute detail. The average track gradient is calculated to hundredths of a percent, for example, and the performance of the diesel engines is even calculated to allow for factors such as altitude and barometic pressure. A window covering roughly the bottom half of the screen provides digital readouts for air brake manifold and reservoir pressures, engine traction motor current, slack and drawbar stress for all engines and each segment of the train, a digital speedometer, elapsed time clock, etc.

The main locomotive controls are calibrated "sliders" which are independently selected from the keyboard and then operated by the cursor keys. These allow applying air brakes for the main engine and other segments, main throttle and helper throttle, and dynamic (engine) braking for both the head engines and helpers. Short machine-language subroutines generate realistic train whistle sound effects upon command, and switch the colors of the screen border as different signals are encountered along the way. The main body of the simulation is written in BASIC, however.

To run the train, the operator simply opens the throttle(s) to the desired level, keeping an eye on the speedometer, engine current ammeters, etc. and then hits the RETURN key or spacebar. The program does all the necessary calculations, updates all the displays, and waits for more input from the operator. The trip proceeds with a new cycle for each 1/5 mile segment

continued on page 386



Engine 64
continued from page 385

of the route at higher speeds; below about 10 mph, it may require several iterations to clear a single 1/5 mile track segment. A short buffer is provided, so if the operator is approaching a long, straight stretch with an even grade, he can tap the spacebar a number of times all at once, and the simulator will keep on cycling one segment after another. The cycle time for a 1/5 mile segment can be as little as a second or so for a short,simple train up to more than ten times that for a long, complicated train running over tough mountain curves. It's not a good idea to let things get too far ahead, as there are random hazards that the program may bring up at any time, such as a red stop signal or a stalled auto on the tracks.

The engine console also provides short error messages concerning traction motor temperatures, compressed air reservoir recharge, wheel slippage, excessive drawbar stress, exceeding any posted speed limits by more than 5mph, etc. If you are recording a hard copy of the trip, all these are printed out on the record, so you can review your mistakes. Speed limit violations are particularly easy to make with a long train; it's easy for a beginner to forget that while the engine may be on a segment of track posted at 70 mph, the rear of the train, perhaps a mile or more behind the engine, may still be in a lower speed zone!

This brings us to a feature of the simulator which I found rather disappointing, i.e. the grpahics, or rather the lack of same. If you get Engine 64 expecting the same sort of visual detail that you get with the popular airplane and submarine simulators commercially produced for the C-64, you'll probably be frustrated with the rather primitive visuals provided here. There is no overhead "map view" of the train or the track layouts provided at any time. The locomotive control panel isn't too bad, but the window in the top third of the screen that supposedly represents the engineer's view out the windshield of the locomotive is not a true perspective view at all, not even the sketchy skeletal graphics that came to the first generation of airplane simulators several years ago.

What you do get is just a series of alphanumeric symbols that represent the next few segments of track. A straight section of track is represented by a pair of vertical lines, a curve by a pair of parenthese, and so forth. No attempt is made to utilize the fairly sophisticated sprite graphics of the Commodore. The overall look and feel is very similar to those early Star Trek games people used to play on CP/M computers, the ones where you could even play with a paper Teletype machine for a terminal if that was all you had. Mind you, this isnt' all bad; color isn't really needed, and you can run the simulation just as well with a junky B & W TV set or a green screen monochrome monitor as with an expensive color monitor. Hard core railfans who love trivial technical detail will probably be satisfied, but the lack of any realistic graphics does take a lot of potential fun out of the program for more casual hobbyists, especially children. This is definitely not a "Software Electric Train" to keep young kids busy on Christmas morning!

The passenger train simulation, as mentioned before, is really a subset of the freight simulator. You are limited to shorter, faster, lighter trains, typically no more than 25 cars. The locomotive has only a throttle and an airbrake; there is no dynamic braking provided, nor any readouts on drawbar stress, etc. The simulated train is not only faster and livelier to operate, with typically greater horsepower-to-weight ratios, but the simplified trains allow the program to cycle each segment a little faster, giving a quicker, less boring feel to the operator.

The hard copy printout feature works fine, yielding usable results with even a slow letter-quality daisywheel, though a faster dot-matrix printer is preferable.

The manual, though a little on the skimpy side when compared to the monster manuals that one often gets with the fancy aircraft simulators, is perfectly adequate for operating trains on the 11 routes that are provided. It does a much less satisfactory job when it comes to guiding the user through the intricacies of editing routes or writing new ones. This is too bad, as one of the strongest points of the program is its ability to generate custom and/or imaginary routes. ●

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Getting The Most From Your C-128

by Patrick A. Tillery

Super Chip 128

To quote Oliver North: I think it's a neat idea! Imagine having the most used utilities instantly available whenever you want without having to dig out the disk and wait for it to load. That's what Super Chip 128 offers. Super Chip 128 may not have the most powerful programs you ever used (they are all packed into only 32K) but, by golly, they are there! We have all wondered about that empty socket on the C-128's motherboard; now there is a use for it—Super Chip 128.

Super Chip 128 comes with a free disk of parameters, several labels with a new function key template on each, a chip, an advertisement of their other products and a tiny little 3x5 piece of paper on which are installation and operating instructions. In these days when we are used to carrying documentation home in a wheelbarrow, this is refreshing, but a little more in the way of instructions might be in order. Let's take a closer look.

Installation: You must, of course, open up your computer to install the chip. Warning! You will void the warranty if you do it. So, if your C-128 is still under warranty, you might wait or take it to an authorized dealer for installation. The actual installation is easy enough but a little scary when you find them suggesting that you break a solder connection by bending back the ground shield until it comes off. The instructions do work though. After you install the Super Chip 128 and conduct the "smoke test," you can start experimenting with some fast new utilities. The "smoke test" (my term, not theirs) is a test I conduct after working on electronics. It goes like this: Plug it in, stand well back, and watch for rising smoke. The Super Chip instructions were clear; the job was not difficult so my C-128 passed the test and I, with a huge sigh of relief, began the following tests.

Compatibility: First, I was surprised that these utilities wouldn't work under other programs like those in Partner 128 do. For example, you can't call up Super Chip 128 while using Word Writer 128. You have to unload Word Writer, then run the Utility. Also, at least one program, Sylvia Porter's Personal Finance Series, won't run at all while the Super Chip is in the socket. It is totally impractical to try to take it in or out to use a program so, at this time, you must choose between them or do what a very enterprising reader named John Mann did. He put in a switch that isolated the Super Chip when he wanted to use Sylvia Porter's. I don't recommend this to the faint of heart or to those who aren't extremely handy!

F1 Key, Nibble Copier. The nibbler works in 40 column only but you can boot up in 80 column and simply switch your monitor to 40 column and use the nibbler. It is there unless you have switched to "fast" mode, in which case you will see lots of pretty colors but no nibbler. The nibbler is quite satisfactory. You have to copy each side in two separate operations, but it has the ability to start and stop at specified tracks and a "Density detector." It uses one or two drives and has a handy directory reader for both drives when two are selected. To test it I tried copying a double sided unprotected C-128 program. It worked fine. I then tried an old error protected program for the C-64. No problem. I tried later versions of games using parameter protection schemes. It acted like all the rest of the nibblers. It copied many programs by itself, but some had to be backed up with parameters. The only "down sides" are that it won't work unless you reset the power on the 1571s. The documentation says: "Some 1571 ROM may require a drive power reset." Mine does

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Getting The Most

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even though I have the upgraded ROM chips. Another "downer" is the strange lack of any way to get out of the program. When you finish with it, you must reset the computer. Oh well, you have to give up something to squeeze it into 32K.

F2 Key. Track and Sector Editor. It works, but this sort of thing is not what this column is all about. As far as I'm concerned they could have left that out and used the space in the 32K for a better set of programs. Besides, it takes up an F key that they could have used to leave my RUN, GRAPHIC, or SAVE keys alone.

F3 Key. Single Drive File Copier. This is not the best one around, but the fact that it is so handy makes up for it. It doesn't take advantage of two drives and it asks you about the files one at a time. You must say yes or no to each file as they come up on the screen. So, if, for example, you only want to copy the first of 20 files, you must say "Yes" to the first one, then "No" to the next 19. Warning! Don't simply press the "N" button many times to rush through the list because when your memory is full or when you run out of files, the program says to put the destination disk in the drive and accepts the next "N" as the signal that you have done so and proceeds to try to write the file to the original disk. This is slightly annoying, but since it won't write over the original program, there is no harm done. And all you lose is the time that you saved by having the program so handy.

F4 Key. Machine Language Monitor. This simply brings up the machine language monitor that came with your C-128. The F7 key is used to do this.

F5 Key. Terminal Program. This is an auto-dial terminal program. Although it doesn't have the frills of a VIP Term XL or Bob's Term Pro, it is quite serviceable. It operates at 300 or 1200 baud and you can change while on-line.

F6 Key. 40/80 Column Screen Dump. This may be the handiest part of it. If you don't have Partner it is very difficult to print a screen. This is here when you need it! It is too bad it doesn't work in 64 mode.

F7 Key. Directory list. This is a simple command to list a directory similar to F4 on your current set-up.

F8 Key. DLOAD. This is handy! It is similar to loading off the directory in the C-64 and, on the C-128, the way I described in the October, 1986 issue of *Computer Shopper*—but easier. You simply load the directory (F7), cursor to the program you want to load, then press F8. It's as simple as that.

I decided to talk to the source about a couple of the items I've discussed about Super Chip 128. I called Utilities Unlimited and talked to the "author" of the programs: Jay Schollmeyer. Jay

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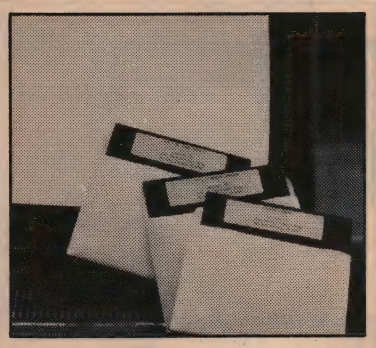

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Getting The Most
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was very helpful and eager to provide all the help he could. First, I asked about the problem getting Sylvia Porter's Personal Finance Series to run while the chip is installed.

Jay: Yes, what we have encountered is that on some products they have made a bad bank call. The slot where that chip resides is in one bank. In normal conditions, if the chip were not there and you made a bad bank call, it would automatically look at bank zero.

Computer Shopper: Put in users terms, without the technical description, the problem is in the Timeworks' program, not in Super Chip. Is that what you are saying?

Jay: Right.

Computer Shopper: And there's no way of getting it to work?

Jay: Not at this time because, technically, when it is not used, the chip is not there and the way the 128 is configured you can look at various segments of memory at any one time by making respective bank calls.

Computer Shopper: OK, have you talked to Timeworks about it?

Jay: No we haven't, not at this time.

Computer Shopper: How about the re-setting required of the 1571s? The documentation says that it might be necessary. I have the latest ROM chips and must every time. Is there any way around that?

Jay: Yes, as a matter of fact, there have been a couple of ROM variations in the 1571 drives themselves. We have just gotten a new version out with an upgrade of that nibbler where that is no problem. It should be being shipped now.

Computer Shopper: Is there a way owners of the old chips can upgrade?

Jay: Yes, you can tell them all that if they return the old chip to us, we will upgrade it free. Just send $5.00 for postage and handling.

Computer Shopper: All right, I'll pass it on. That's very generous. Ok Jay, I guess that's it. Do you have anything new coming up that we would be interested in? You, at Utilities Unlimited, judging from all the new things you are coming out with are determined to become a leader in this field.

Jay: Well, we have the Super Chip Version "C" where we are using a 64K chip instead of the 32K. A scaled down version of Free Spirit Software's 1581 Utility's is in one 32K segment of it with basically the Super Chip 128 as we know it now on the other 32K.

Computer Shopper: OK, one last question. I just received an excellent letter from a reader (see Charles' letter) wherein he requested information on a really wonderful utility that he had dreamed up. He described what is, in effect, a RAM disk utility using his 1750 RAM Expansion. He is right! I, too, would be first in line to buy one. Do you have any plans for something like that or could you be induced to consider it?

Jay: Not at this time. Unfortunately, this sort of thing is based on how well something is selling in the market and at this time that is a very narrow market.

Computer Shopper: You mean the RAM expansion itself hasn't sold well enough to make it worthwhile?

Jay: Right. Maybe someday in the future, but probably not.

To sum up: These are not the best utilities and program of their kind. They have a few bugs and one misspelled word on the screen, but they are squeezed into a very small package and the price is right—$29.95. And best of all, they are there when you need them! Fast! A neat idea. I recommend them if you aren't using Sylvia Porter's Personal Finance Series.

Letters

Thank you so much for your "Getting The Most From Your C-128" column! I find it the best around for my type of computer use. I have two 128s (one in my school office, and one at home) and use most of the Timeworks programs.

I have come up with an idea for a utility program that I would find very useful, and it seems others might as well. My question is: Is this already available, or is it something to throw out to all those "eager beaver" program writers out there?

The utility would set up my 1750 RAM Expander as a temporary disk drive (device 9 or 10) and then the same program would act as a disk nibbler to transfer an entire disk from the real disk to the RAM disk. I would like to use it this way: it would load my Timeworks Dictionary or Thesaurus (or maybe both) into RAM. There would have to be a way to exit the program without turning off the computer. (You don't want the RAM to die.) Then I would load Word Writer 128 without the autoboot by typing "BOOT WW." (I got that from your column.) It would be a great idea to also have the ability to transfer the RAM file back to the real disk for someone who used it for data files.

The result would be a high speed checker that could be used for lots of small documents. I could even include my own sub-dictionaries. Right now I have each day's history lecture notes on separate files. Hundreds of these files remain to be spell-checked because the whole dictionary must be cranked in for each file. The RAM utility would not only cut that to one load, but it would also speed up the search for the 200 words to roll through when there was a misspelling. In short, it would be fast!

It also occurs to me that if this were available, the RAM could be used as a second drive, making my second 1571 almost unnecessary. The RAM expander and this program could sell for less than a 1571 disk drive so this idea should be profitable.

"Anything you and your many experts can make me aware of will be greatly appreciated. Thank you again for all the useful information that keeps coming in *Computer Shopper.*" Charles Wilkinson, Hagerstown, MD.

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Getting The Most
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Charles, as you can see from the first part of this column, I think your idea is great! I tried to interest Utilities Unlimited in it. Perhaps if there were such a utility, the RAM expansion would sell better.

What you describe is rather common in MSDOS and CP/M machines. It is called a RAM disk. As a matter of fact, one comes in the CP/M operating system that came with your RAM Expansion. CP/M for the C-128 dated 6 Dec. '86 has it. You treat it exactly like another disk drive only it is labeled "M." CP/M and MSDOS identify their drives with letters instead of numbers. Our drive 8 is their A, 9 is B, etc. When I used CP/M on the C-128, that was the only thing that made it fast enough to be tolerable. When you boot up in CP/M it checks for two files on the disk; SUBMIT.COM and PROFILE.SUB. If it finds SUBMIT.COM, it completes the series of commands that it finds in PROFILE.SUB. I constructed my PROFILE.SUB (which is the same as a batch file called AUTOEXEC.BAT in MSDOS) to look like this:

A> SCREEN40 OFF	The A> is CP/M's way of telling you you are defaulted to (using primarily) the "A" drive. The rest allows the computer to stop writing the 40 column screen thus doubling the speed. Similar to "FAST" in C-128 mode.
A> PIP M:=A:*.*	PIP is the command to copy. In this case, copy to the "M" drive from the "A" drive. The *.* is the wild card on both sides of the separater. In other words, copy everything from "A" drive to "M" drive.
A> M:	This changes the default drive to "M." Meaning that from now on it will look first on the RAM disk for files.
M> WS	Loads WordStar from the RAM disk (drive M). I used the same method to load dBase II. In the case of dBase II, I also loaded in the contents of "B" drive (data) if there was enough room. As you suggested, if it were used for data, I had to remember to save the data back to a "real" disk before stopping a session.

The RAM disk made CP/M quite fast on the C-128. In fact, dBase II and WordStar were faster than on an MSDOS machine using floppies. I could have entered all those commands manually, one at a time, but with the auto-loading feature described earlier, I would get it started and go get a cup of coffee. By the time I got back it was all done. This copying was the only slow part, but since the RAM disk wrote almost instantly, this copying was much faster than copying to a floppy.

Finally, there are a few programs around that already use the expansion module as a RAM disk. Big Blue Reader CP/M (see this column in the December 1987 issue) and Sylvia Porter's Personal Finance Series (April, 1988 issue) come to mind. I'm sure there are others.

Charles, yours is an excellent idea! I hope someone reading this will take our not very subtle hint and write such a program. If I hear of one I will let you know right here!

Super Chip 128 is marketed by Utilities Unlimited, 12305 N.E. 152nd St., Brush Prairy, WA 98606. For more information on Word Writer 128 and Sylvia Porter's Personal Finance Series, contact Timeworks Inc., 444 Lake Cook Road, Deerfield, IL 60015. MSDOS is a product of Microsoft Corporation, 10700 Northrup Way, Bellevue, WA 98004. CP/M is from Digital Research, Inc., P.O. Box 579, 160 Central Avenue, Pacific Grove, CA 93950. For more information on Big Blue Reader CP/M contact S.O.G.W.A.P. Software, Inc., 611 Boccacio Ave., Venice, CA 90291. WordStar is a product of MicroPro International Corporation, 1299 Fourth Street, Suite 400, San Rafael, CA 94901. dBase II is by Ashton-Tate, 10150 West Jefferson Blvd., Culver City, CA 90230; 1-800-437-4329. Super 81 Utilities are from Free Spirit Software, 538 S. Edgewood, La Grange, IL 60525; (312) 352-7323. Bob's Term Pro is from Progressive Peripherals & Software, 464 Kalamath Street, Denver, CO 80204; (303) 825-4144. VIP Term XL is from Softlaw Corporation, 132 Aero Camino, Goleta, CA 93117; (805) 968-4364. ●

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by I. J. Lyles, Jr.

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The First Game

Top Gun is attractively packaged in a box showing three F-14s climbing into the sun on the front and two screen shots on the back. We are promised 3-D vector graphics and unending action. My initial excitement was somewhat drained when I finished loading the program into the computer. The game took almost four minutes to complete loading. That is a long time to wait! When loading is complete, you are presented with a split screen showing two aircraft carriers, one on the left side and one on the right. Each aircraft carrier has a tiny aircraft on it's deck. While jazzy music plays, the little planes move down the decks and lift off. After liftoff, the planes climb for the sky at a steep angle. You must wait until the planes vanish off the top of the screen before you can begin to play the game. For two players, plug joysticks in both ports. A single player plugs into port one.

3-D Playing

When you do get to play, you are presented with a dotted line running through the center of the display. This represents the horizon as seen out the cockpit window for each pilot. The split screen is maintained throughout the game. The F-14s are shown as wire frame images (not solid, just the outlines). This is the 3-D vector graphics mentioned earlier. If you are the pilot on the left and see a plane in your window, you are seeing the enemy plane. If you see a plane in the other window, it is your own seen from the enemy viewpoint. The same is true for a second player (or the computer) playing on the right, except in reverse. (I know this sounds confusing, and it can be, until you play for awhile and get used to the two viewpoints.) Aircraft movement is realistic and appears to be truly 3-D. Push the joystick to the right and the horizon line will rotate left. With the stick left the horizon swings right. To dive, push the joystick forward. The horizon will move toward the top of the screen. Altitude is shown at the top

continued on page 465

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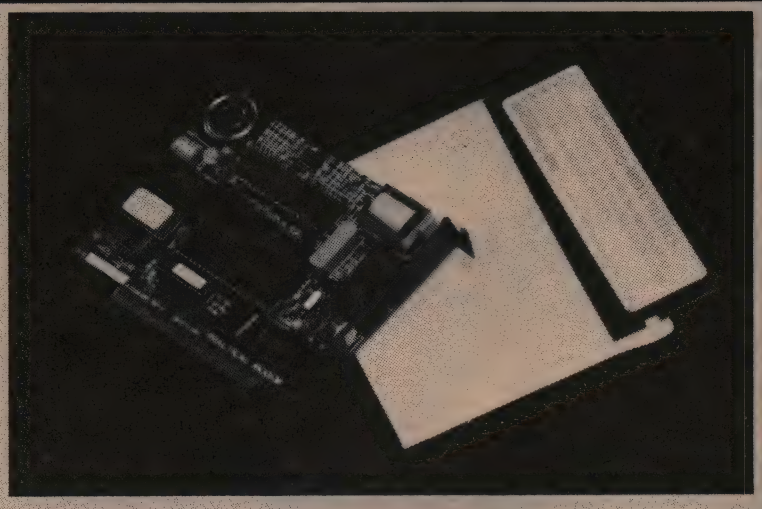

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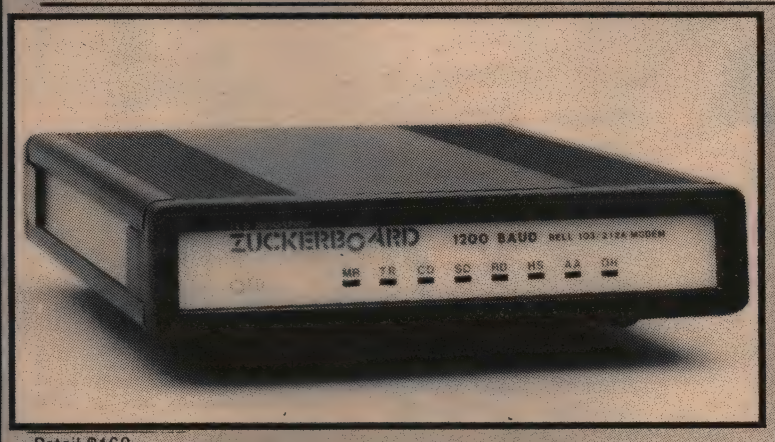

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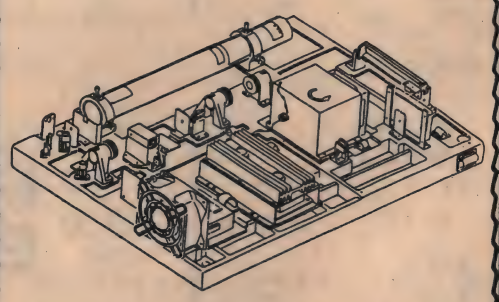

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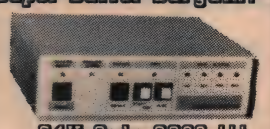

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1838-1842 LAW: Legal text files for attorneys and law students interested in contracts, torts, property, evidence, constitutional and criminal law. View files with the type command. (5 disks)

• DOS UTILITIES •

1906 FASTCOPY V2.1: Faster than DISKCOPY. Also has Jaws, a loan amortization program.

952 EASYMENU: A multi menuing system featuring fast setup and unlimited menus for all hard disks using either keyboard or mouse setups. This program will run on the PC/XT/AT,PS/2.

1950 KOPY: A small utility intended as a general replacement to the DOS COPY command. KOPY copies files matching a pattern to a target directory. KOPY accepts either specific file names or wild-cards.

1959 HELP DOS: Extensive tutorial on DOS 2.0 commands. This program is menu driven and includes advanced and batch commands and special keyboard keys. Great for a new DOS user.

1961 SHORTCUT: RAM resident menu driven program that simplifies DOS with one line commands. The main screen will display the equipment installed in your computer, disk status, memory status, time/date and the main DOS commands. (Requires 256K and One Disk Drive).

3110 PROFESSIONAL MASTER KEY A sophistIcated clone of Norton's Utility. Offers some advantages over Norton's in file editing. Provides for un-erasing files and directories, viewing a map, renaming and erasing files, and resetting file attributes.

• DOS UTILITIES cont'd •

1953 FILECAT: Consists of an ISAM database with B+Tree structure. It is menu driven for the ease of use. It works with floppy or hard disk systems. It also has a library of 700+ KEYWORDS with search and sort capabilities.

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3070 VIDEO LIBRARY V1.1: Requires color graphic adapter, 1 disk drive and 256K memory. VIDEO LIBRARY will maintain your video tape and disk collection. It will display your collection alphabetically on screen or printer.

912/913 FILE EXPRESS V4.14: A great database program. Information can be put into computer, printed, sorted and displayed. Names and addresses can be entered and sorted into zip code or last name sequence, or printed out onto mailing labels and updated. The same data can be included in reports, or simply displayed on the computer screen when needed. (2 disks)

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789 OPTIKS: System designed along the lines of spread sheet for graphics. It is a large paste up board for graphics from various sources. It can read graphics files from Apple MacPaint, PC Paintbrush, Microsoft Paint and a dozen or so other file formats.

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1839 MASS APPEAL A general purpose mailing list management program designed for PC's and compatibles. Generate reports, address envelopes, create mailing labels, print rotary cards, and create interface files.

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302/326/371 Q-MODEM V3.1: Fast Modem software, disk 326 is docs. (3 disks)

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1123 VARDENT: A utility for the restructuring of basic source code for compilation with such compilers as Turbo Basic. It allows the line numbers to remain, and if you desire, it will also allow the indentation of certain commands such as the print statement.

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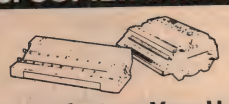

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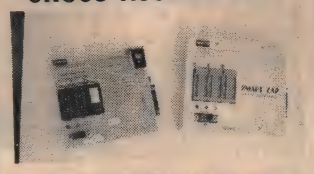

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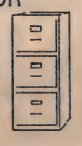

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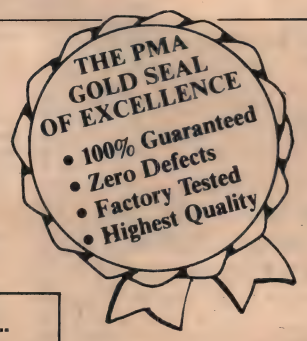

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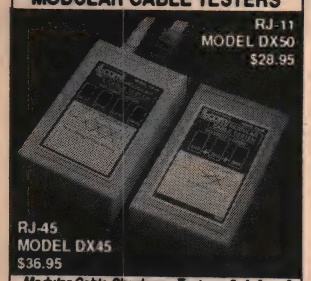

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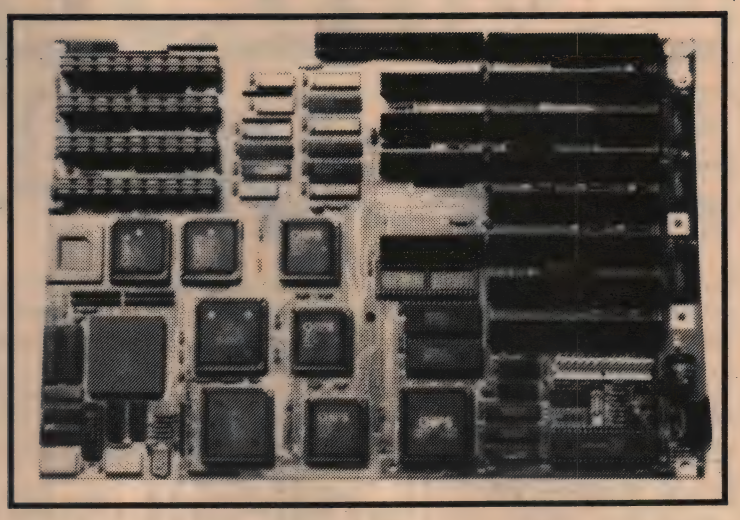

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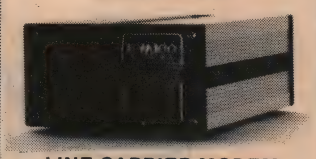

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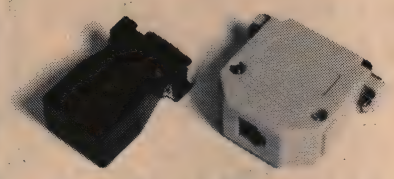
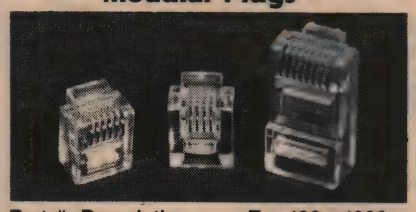


Use these modular adapter kits to turn D-Sub ports to 6 or 8 pin modular jacks.

Part#	Description	Ea.	50+	100+
K9M-6	9 pin male to 6 pin	2.43	1.89	1.70
K9F-6	9 pin female to 6 pin	2.57	2.00	1.80
K9M-8	9 pin male to 8 pin	3.14	2.44	2.20
K9F-8	9 pin female to 8 pin	3.43	2.67	2.40
K25M-6	25 pin male to 6 pin	2.43	1.89	1.70
K25F-6	25 pin female to 6 pin	2.57	2.00	1.80
K25M-8	25 pin male to 8 pin	3.14	2.44	2.20
K25F-8	25 pin female to 8 pin	3.43	2.67	2.40

Modular Plugs



Part #	Description	Ea.	100+	1000+
MP-4	4 pin plug	.20	.15	.11
MP-6	6 pin plug	.25	.18	.14
MP-8	8 pin plug	.30	.22	.17

Modular Wire

Part #	Description	Per ft.	100 ft.	1000 ft.
MW-4	4 conductor	.10	5.00	40.00
MW-6	6 conductor	.15	8.00	65.00
MW-8	8 conductor	.20	10.00	83.00

Modular Crimping Tool

Part#	Description	Ea.
MCT-06	Crimps 4 and 6 pin modular plugs	12.50
MCT-08	Crimps 8 pin modular plugs	22.50

RS-232 BREAK-OUT BOX

Pocket sized-for circuit testing, monitoring and patching.

Model#	Ea.	10+
BRB-232	39.95	35.00

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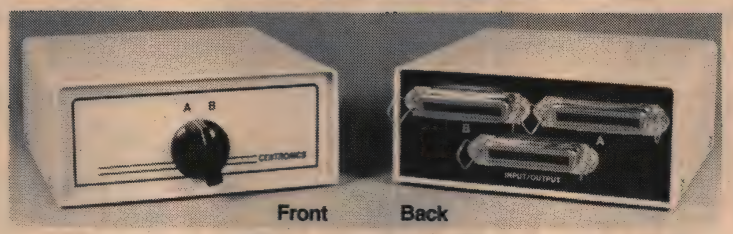
Model#	Ea.	10+
MWD-232	8.95	7.00

Switchboxes



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DB-25 Female Connectors

Model #	Description		Ea.	10+
SB25-2	2 Way	25 Line	20.00	18.00
SB25-3	3 Way	25 Line	26.00	23.00
SB25-4	4 Way	25 Line	29.00	25.00
SB25-5	5 Way	25 Line	39.00	34.00
SB25-X	Crossover	25 Line	30.00	26.00

Centronics Female Connections

Model #	Description		Ea.	10+
SB36-2	2 Way	36 Line	24.00	22.00
SB36-3	3 Way	36 Line	30.00	26.00
SB36-4	4 Way	36 Line	35.00	30.00
SB36-5	5 Way	36 Line	45.00	39.00
SB36-X	Crossover	36 Line	38.00	33.00

DE-9 Female Connections

Model #	Description		Ea.	10+
SB9-2	2 Way	9 Line	20.00	18.00
SB9-4	4 Way	9 Line	35.00	30.00

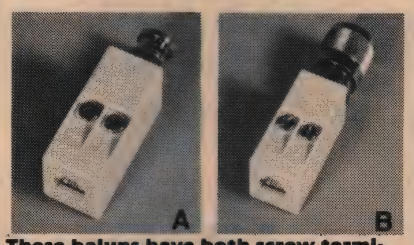
DA-15 Female Connections

Model #	Description		Ea.	10+
SB15-2	2 Way	15 Line	24.00	20.00

DC-37 Female Connections

Model #	Description		Ea.	10+
SB37-2	2 Way	37 Line	25.00	23.00

Coaxial Baluns



These baluns have both screw terminals and RJ-11 jack built in to each unit.

Part#	Description	Ea.	10+	50+
(A.)BL-01	BNC Balun	9.95	8.50	7.00
(B.)BL-05	Twinax Balun	19.95	16.00	14.00

Gender Changers

Model#	Description	Ea.	10+
GC-9M	9 pin male to male	4.50	3.75
GC-9F	9 pin female to female	4.50	3.75
GC-25M	25 pin male to male	4.95	4.00
GC-25F	25 pin female to female	4.95	4.00
GC-36M	36 pin male to male	6.50	5.50
GC-36F	36 pin female to female	7.00	6.00

Problem Solvers

Model#	Description	Ea.	10+
MWD-232	RS-232 mini wiring device	8.95	7.00
MT-232	RS-232 mini tester	8.95	7.00
SP-232	RS-232 surge protector	8.95	7.00
BRB-232	RS-232 breakout box	39.95	35.00
MSP-232	Modem surge protector	12.95	10.00

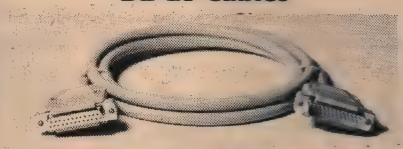
Cable Assemblies

Parallel Printer Cables

PC/AT and compatibles

Model#	Description	Ea.	10+
PC301-6	6 foot	7.00	6.00
PC301-10	10 foot	8.00	7.00
PC301-15	15 foot	12.25	10.00
PC301-25	25 foot	18.50	15.00

DB-25 Cables



male to male all lines wired

Model#	Description	Ea.	10+
25MM-6	6 foot	7.00	6.00
25MM-10	10 foot	8.00	7.00
25MM-25	25 foot	18.00	16.00
25MM-50	50 foot	34.00	30.00
25MM-100	100 foot	63.00	56.00

male to female all lines wired

Model#	Description	Ea.	10+
25MF-6	6 foot	7.00	6.00
25MF-10	10 foot	8.00	7.00
25MF-25	25 foot	18.00	16.00
25MF-50	50 foot	34.00	30.00
25MF-100	100 foot	63.00	56.00

Centronics Cables

male to male

Model#	Description	Ea.	10+
36MM-6	6 foot	8.00	7.00
36MM-10	10 foot	10.00	9.00

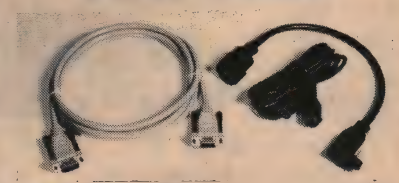
Apple Cable Assemblies

Model#	Description	Ea.	10+
AC-1	MAC to IMAGE II	8.95	6.00
AC-2	IIe to IMAGE II	8.95	6.00
AC-3	IIc to IMAGE II	8.95	6.00
AC-4	MAC+ to IMAGE II	8.95	6.00
AC-5	MAC+ to ADAPTER	8.95	6.00
AC-6	MAC+ to MODEM	8.95	6.00
AC-7	8 PIN MINI DIN	6.95	5.00
AC-8	MAC to MODEM	8.95	6.00
SCSI-HD	MAC+ to SCSI DISK	9.95	8.00
SCSI-DC	SCSI DAISY CHAIN	11.95	9.50
SCSI-EC6	SCSI 6' EXT. CABLE	14.95	13.00

IEEE-488 Cables

Model#	Description	Ea.	10+
488-1	1 meter	39.95	35.00
488-2	2 meter	43.95	38.00
488-4	4 meter	49.95	43.00

Other Popular PC/XT Cables



Model #	Description	Ea.	10+
MEC-6	Monitor Extension	5.95	4.50
KEC-6	Keyboard Extension	3.95	2.50
RGB-6	RGB Cable	6.95	5.50
9MM-6	9 Pin Male-Male	5.95	4.50
DFC-2	Dual Floppy Cable	4.95	4.00
HDC-XT	XT Hard Drive Cable Set	4.95	3.50
HDC-AT	AT Hard Drive Cable Set	8.95	6.75
PSC-6	Power Supply Cord	3.95	3.00
PEC-6	Monitor Power Ext. Cord	5.95	4.50
PAC-6	Power Adapter Cable	4.95	4.00

NEW EPSON FX-86E AND FX-286E PRINTERS

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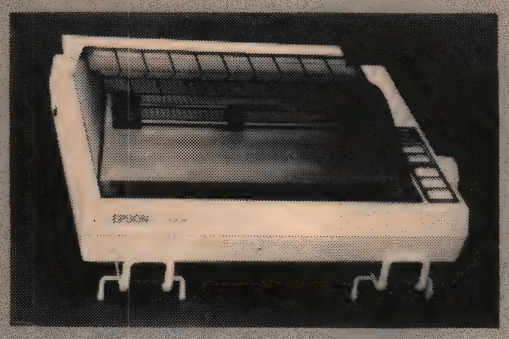
EPSON FX-86E

LIST $549



$CALL$ and $SAVE$

- NOW WITH FREE FORMS TRACTOR
- 240 cps Draft Mode, 48 cps, NLQ
- SelectType Typestyle Selector
- 8K Internal Print Buffer
- One Year Warranty

Quality, Dependability, Performance

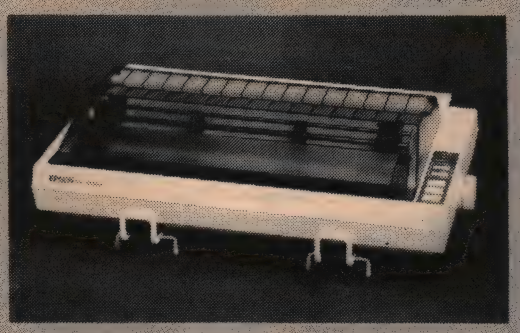
Quite simply the FX-86E is the most intelligent way to print you can find. At a lightning fast 240 cps in draft mode and 48 cps in Near Letter Quality mode, the FX-86E gives you professional versatility. An 8K print buffer speeds up productivity by allowing quicker access to your computer. Plus, for an added measure of creativity, Epson's exclusive SelecType feature gives you finger tip selection of numerous popular typestyles at the touch of a few buttons. The FX-86E is also equipped with pin feed, friction feed, and pull tractor feed as standard. It also accepts optional accessories such as single bin cut sheet feeder, 32K buffer and serial interface boards. And with Epson's one year warranty, you can be sure you're getting the most in quality, dependability and performance.

NEW *From home business to the large corporate user, the Epson FX-286E will help increase your office productivity.*

EPSON FX-286E

$CALL$ and $SAVE$

List $799



OPTIMUM VERSATILITY

- Fast 240 cps Draft, 48 cps NLQ
- 8k Print Buffer
- Dependability with a One Year Warranty
- Both Friction & Tractor Feed

The New Epson FX-286E Printer is a 136 column, 9 wire printer that prints at a fast 240 cps in draft mode and 48 cps in Near Letter Quality Mode to save you time and increase productivity. You also get quicker access to your computer with its built-in 8k printer buffer. The FX-286E features unique single stroke selection of numerous typestyles through Epson's exclusive SelecType feature. Friction feed, tractor feed and built-in parallel interface are standard, as well as unique new features such as Double High Characters, standard Sans Serif Font and Automatic Single Sheet Loading. The new FX-286E also has dual identity; Epson Standard Code for Printers (ESC/P) and IBM Proprinter XL emulation, and both modes are dip switch selectable for compatibility with a wide variety of software applications. You can even print those complicated graphs and charts with the FX-286E's graphic capabilities and the down-loadable IBM character sets.

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COMPLETE EPSON LINE...

Printers		Retail	Your Price
LX-800	180 cps, NLQ, Epson/IBM Compatible	$299	$CALL$
FX-86e	240 cps, 8K, Epson/IBM Compatible	549	$CALL$
FX-286e	240 cps, Wide Carriage, Epson/IBM Compatible	799	$CALL$
EX-800	300 cps, NLQ, Color Option	649	$CALL$
EX-1000	300 cps, Wide Carriage	899	$CALL$
LQ-800	180 cps, 24-Pin, Epson/IBM/Diablo Compatible	599	$CALL$
LQ-1000	180 cps, 24-Pin, Wide Carriage	999	$CALL$
LQ-2500	405 cps, 24-Pin, Wide Carriage, Color Option	1449	$CALL$

Printer Accessories		Retail	Your Price
EX-800	Sheet Feed	$199	$CALL$
EX-800/1000	Color Module	79	$CALL$
EX-800/1000	Scanner	299	$CALL$
LQ-800	Tractor Feed	59	$CALL$
LQ-800/FX-86e	Sheet Feed	169	$CALL$
LQ-1000	Tractor Feed	69	$CALL$
LQ-1000/FX-286e	Sheet Feed	229	$CALL$
LQ-2500/EX-1000	Single Bin Sheet Feed	249	$CALL$
LQ-2500	Dual Bin Sheet Feed	399	$CALL$

Printer Accessories		Retail	Your Price
LQ-2500	Color Module	$ 99	$CALL$
LQ-2500	Scanner	299	$CALL$
LX-86, LX-800, LX-86e/286e	Serial I/F Board, 8K	129	$CALL$
LX-86, LX-800, LX-86e/286e	Serial I/F Board, 2K	59	$CALL$
LX-86, LX-800, LX-86e/286e	Parallel I/F Board, 32K	175	$CALL$
LQ Series	Font Module	59	$CALL$
LQ Series	Identity Module	89	$CALL$

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HOTLINE: 513-368-2307 (For Technical Assistance or Information on Your Order)

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is a versatile and reliable printer for home, school or office.

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Retail $289

Retail $499

NEW star micronics
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The Star NX-15 gives you full front panel control in a 120 cps draft and 30 cps NLQ. You get great looking originals time after time with the hardworking NX-15.

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- Large 5K Print Buffer
- Standard Parallel Interface
- Adjustable Paper Saving Rear Push Tractor
- Inexpensive Automatic Single Sheet Feed Option Available
- Easy Front Panel Operation
- 1-Year Manufacturer's Warranty

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		Retail	Sale
NX-10	120 CPS + NLQ, Epson/IBM Compatible	$349	~~$169~~
NX-10C	Commodore Compatible	349	~~179~~
NX-1000	NEW Multi-Font Selection, 144 CPS, 4K, Paper Parking	299	~~179~~
NX-1000C	Commodore Compatible	299	~~179~~
NX-1000CL	Prints 7 Colors	379	~~249~~
LV-1215	120 CPS, IBM Compatible, 136 Column	499	~~199~~
LV-1615	160 CPS, IBM Compatible, 16K, 136 Column	699	~~239~~
LV-2015	200 CPS, IBM Compatible, 16K, 136 Column	799	~~269~~
SD-10	160 CPS, IBM/Apple Comp., Parallel Interface	599	~~219~~
SD-15	160 CPS, IBM/Apple Comp., 15" Carriage	749	~~249~~
SR-10	200 CPS, IBM Compatible, Parallel Interface	679	~~239~~
SR-15	200 CPS, IBM Compatible, 15" Carriage	799	~~269~~
NX-15	120 CPS + NLQ, Epson/IBM Comp., 15" Carriage	529	~~319~~
NR-10	240 CPS, Epson/IBM Comp., 12.6K Print Buffer	579	~~339~~
NR-15	240 CPS, Epson/IBM Comp., 12.6K, 15" Carriage	799	~~489~~
NB24-10	24-Pin, 180 CPS, Epson/IBM Compatible, 8K	749	~~449~~
NB24-15	24-Pin, 180 CPS, Epson/IBM Comp., 15" Carriage	999	~~559~~
NB-15	24-Pin, 300 CPS + NLQ, Epson/IBM Comp., 15" Carriage	1399	~~849~~
PowerType	18 CPS Daisywheel, Both Parallel & Serial Interfaces	599	199
Star Printer Ribbons		As Low As	99¢ each

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C*SIX—NOTES

C*SIX Information Sources Keeping In Touch

by Michael A. Banks

***Computer Shopper* Online: C*SIX/DELPHI**

If you're new to C*SIX and wondering where the action is, check out our Forum, where you'll find a discussion on just about any computing topic. Recent subjects of discussion include Apple's Claris, the possibility of a 16-bit Atari game machine, non-bus "disposable" computers, and other hardware and software topics. And don't forget, you can start your own topic, or post a question to be answered, too.

We're still looking for feedback, too. E-mail your suggestions, comments, or criticisms to TEDDRUDE.

Finding Out "What's New" In C*SIX

As you've probably noticed in the past, announcements on current topics of interest are periodically displayed when you enter the SIG. These are special messages called "Briefs" that are displayed to you only once (DELPHI keeps track of which messages you've seen).

Similar messages may pop up when you enter the Conference, Database, Forum, or Poll areas.

Ever wonder where those messages come from—or go? Did you miss something important the last time one scrolled by? Want to find out what else is new in the SIG? Type ANNOUNCEMENTS at the C*SIX Main Menu. This selection leads you to the Announcements area and this category selection menu:

```
Announcements Menu:
What's New          Recent Software Changes
Conference News     Main Banner Display
Database News       Membership Agreement Display
Forum News          New Member Welcome Display
Poll News           Exit
ANNOUNCE>Which Announcement Category?
```

The selections on the left side of the menu lead to those "Briefs." Select one of those topics, and you'll see an appropriate prompt (such as WHAT'S-NEW>), and DELPHI will tell you how many announcements are available in this particular category. Type SCAN to see a directory of waiting messages, which will be similar to this sample:

```
Contents
1 15-MAR BRIEF CHECK OUT FORUM
2  5-MAR BRIEF CALL FOR FEEDBACK
3 14-FEB BRIEF TIMEX SINCLAIR
4 29-JAN BRIEF NEW TOPICS
5 27-JAN BRIEF CONFERENCE POLL
6 26-DEC BRIEF AD COMPLAINT PROCEDURE
```

To read a message, simply type its number. Press <RETURN> to see the message immediately following. (Type ? to see a menu of other choices.)

(The one-time "Brief" messages contain the word BRIEF in their titles. The What's-New category contains the Briefs that are displayed when you enter the SIG.)

Of the selections on the right side of the category selection menu, all but one display specific announcements, then return you to the Announcements category selection menu. Thus, "Main Banner Display" displays the SIG's banner (the C*SIX logo and accompanying text); "Membership Agreement Display" displays the terms to which you agreed when you joined; and "New Member Welcome Display" displays the welcoming message you read when you first joined C*SIX.

"Recent Software Changes" leads to a self-directing database which you can search for information about new features in the SIG's operating software.

Special DELPHI Signup Offer

Don't forget that as a *Computer Shopper* reader you are eligible to subscribe to DELPHI via a money-saving online signup offer. This offer gets you a copy of *DELPHI: The Official Guide*, a lifetime membership, and a free hour of non-prime time—a $49.95 value for only $19.95.

DELPHI charges no monthly minimum, and non-prime rates are only $7.20 per hour (12 cents per minute)—at any baud rate, even 2400! This makes DELPHI one of the best online bargains going. (And if you sign up for DELPHI's Advantage plan, you get an even better deal: a non-prime rate of only $5.40 per hour. All you have to do is commit to at least four hours of minimum usage per month.)

To take advantage of this offer, dial up DELPHI via your local Telenet or Tymnet number, or use DELPHI's direct-dial Boston number. Use the "standard" communications parameters: full duplex, and either 7/E/1 or 8/N/1. DELPHI's online "address" for Telenet is C DELPHI. The Tymnet address is simply DELPHI.

When you connect with DELPHI, type JOINDELPHI at the "Username:" prompt, and SHOPPER at the "Password:" prompt. DELPHI will recognize you as a *Computer Shopper* reader and take over from there.

(If you need your local Telenet or Tymnet number or general access information, call DELPHI—voice—at 800-544-4005, toll-free outside Massachusetts. In Massachusetts or outside the U.S., call 617-491-3393.) ●

Bulletin Boards R'Us!

by Hal Nieburg

An AT&T calling card would be handy, but don't bring your MasterCard. The World's Greatest Software Store is open 24 hours a day and is connected to the keyboard of your computer. At the very end of your telephone line is the supermarket of computing. If you have not browsed through this commissary of surprises and delights, what are you waiting for?

Most important, the online market is the natural setting for shareware distribution; and shareware is getting better everyday. By allowing all comers to up/down-load their products, shareware programmers avoid the costs of marketing and packaging, and can thereby offer more features and power at prices that commercial channels cannot match!

As computing matures, the role of shareware changes; it graduates from an idiosyncratic showcase for exhibitionists, to become a major player in the game. On bulletin boards all over the map, you can find not only obscure utilities, but also a full range of applications, competitive, for some users, with commercial products.

Every month there are interesting specimens of both kinds to report.

GRIDWORKS is a program that allows the user of an Epson (or compatible) 24-pin LQ-1500 or LQ-500, 800, 1000 to construct their own custom characters using the keypad or a Microsoft mouse. Downloaded characters are useful for creating your own printer character-set. Symbols and characters not present in the IBM DOS extended set (decimals 128 to 255) may be designed by the user, including esoteric alphabets, such as Turkish, Cyrilic, or Czech.

After choosing the printer type you are presented with a grid representing the letter quality (highest resolution) grid for the chosen printer. You are now free to move the cursor around with the mouse or the keypad (diagonals included) to design your character. Pressing the " + " key puts a marker in the box of the current cursor position. Pressing the " – " key erases the marker in the current cursor box if it is already marked. Figure 1 shows the working screen.

While you are designing the character you have two options, LOAD and CALCULATE. The former loads a previously defined character for editing; while the latter brings up another set of options, which perform the calculations necessary to print or store the new character, or to clear the grid to start again from scratch.

A character is saved in an ASCII file under a specific key and reference name. This is used as data to generate the proper codes which enable the printer to reproduce these bit-mapped characters. The ASCII alpha file remains intact. To download a font file to the printer, the user types "copy" the data file to LPT1.

The printer will beep and you can then run your word processor. To imbed the new character in a file, you merely strike the key-combination which has been defined by GRIDWORKS. On encountering the unfamiliar symbol, the printer will follow the redefined instructions and produce the new font characters.

A set of Greek letters and some mathematical symbols are provided with the package, which can be found on many boards as EPPROGR.ARC (75K). It can be found on the BXR Info Corner BBS (703-756-6109). It comes from the keyboard of Christopher M. Greiner (4 Rose Terrace, Grosse Pointe Farms, Michigan, 48236; registration fee is $25).

Fill Floppies To Brim

Here is a most unusual bit of insight. It does a small task that may save all of us many minutes and hours of painful work.

This is the typical situation: You want to carry the files of a directory from one hard-disk to another. You have to copy the files from this directory to floppy disk. The directory contains several files, some big, others small. You quickly get the message "Insufficient disk space," and realize that you will have to copy your directory on several floppies, and that you may leave large spaces vacant on each in the process.

You have two choices. First, copy each file separately checking the space remaining and the size of the next file. Second choice, you can use a back-up program. The backup program is a good solution but you will have to carry the restore program with you. Here is a third solution. It is called FILL and comes from Jean Lalonde (6667 de Normanville, Montreal, Quebec, Canada, H2S-2B8; Compuserve ID: 76606,671, BIX Info Exchange "jlalonde"). It can

continued on page 417

Bulletin Board

The Bulletin Board is a regular feature of the *Computer Shopper*. This is where you can list your COMPUTER RELATED Remote System at no charge. All listings are in state (with non-U.S. listings last) and phone number sequence. If you would like to have your Remote System listed, please follow the instructions listed below:

Submission Policy

All Remote System entries must be submitted in **writing** by the first of every third month and must include the phone number for the system. **Submissions received by the first of July will appear in the September issue.** The listing will be good for the next three issues unless the information is found to contain errors.

Due to the increased size of this listing, it has become necessary to reduce the number of systems listed on these pages. Effective immediately, only systems supporting computer-related topics with storage capacity of at least 10 MebaBytes and for which the SysOps have submitted complete details about the system will be published. We will continue to include **ALL** systems in the REMSYSmm.0yy text file which is distributed on GEnie, and many remote systems. **FOG**, THE International Non-profit Computer Users Group, is an organization devoted to the enhancement of the computer experience. Maintenance and verification of entries in **The Bulletin Board** is just one of the many services funded by FOG members for the computing public.

A large percentage of the listings received have been voice numbers not associated with Remote Systems. This is an inconvenience for owners of the phone numbers which must be eliminated.

FOG members will attempt to verify that each listing is in fact a remote system. If a listing is found to be inaccurate, it will immediately be deleted from the listing. **If an update report is not received** every three months, the listing will also be deleted. All SysOps are responsible for promptly forwarding accurate information to:

FOG
Remote System listing
P. O. Box 3474
Daly City, CA 94015-0474

or one of the following E-mail services:

on GEnie, address mail to OFFICE.FOG

on MCI Mail, address mail to 347-8112 (or FOG)

on CompuServe, address mail to 71561,570

on FOG #6 (415-755-8315), leave a comment to the SysOp

Please include the system's phone number in all correspondence. If reporting a phone number change, be sure to include **both** the old and the new numbers. We cannot locate a system without a phone number.

We are not responsible for errors published in these listings.

United States

USA

Alaska

(907)337-4136 Anchorage. Baud: 3/12/24, online: 24 hrs (disk space = 100Mb) SysOp: Bob Docker. North Lights BBS. Sponsored by Amiga User's Group in Alaska. Using BBS-PC,A1000.

(907)349-2459 Anchorage. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Truman S. Walrod. TW3 BBS & RCP/M+. Sponsored by **FOG** A.M.O. 63--Ankor-Guide Computer Group. Using Exec & Metal.

Alabama

(205)341-1616 Mobile. Baud: 300, online: 24 hrs SysOp: Edward W. Jones. Co Co Board of Mobile. Using CoCoI for 7/1/N. All downloads, articles, and notices are for the Color Computer user.

(205)536-3827 Huntsville. Baud: 3/12, online: 24 hrs (disk space = 30Mb) SysOp: M.D. Smith. MDS-PC-RBBS. For PC and compatibles. Public domain software. Up/downloading.

(205)854-9074 Birmingham. Baud: 3/12/24, online: 24 hrs (disk space = 220Mb) SysOp: Bill Freeman. The Connection BBS. For politics and jokes,religion Con.Supports IBM/compatibles, Apple, Atari, Amiga, C-64/C-128.

(205)854-9661 Birmingham. Baud: 3/12/24, online: 24 hrs SysOp: David Alge. Apple Valley. Using PC Board 12.1/E3 for conferences covering all popular computers. Also have specific SIGs, Trade war, more.

(205)880-1290 Huntsville. Baud: 2400, online: 24 hrs SysOp: James Holland. Date Line Huntsville. Using IBM for Oracomm-II node 26. Dating, jokes, etc. Fee required.

Arkansas

(501)224-9454 Little Rock. Baud: 3/12, online: 24 hrs SysOp: Rick Mobley. ROSBBS LR. Sponsored by Little Rock CP/M-MS/DOS Tech User G. For CP/M and MS/DOS.

(501)248-1931 Cave Springs. Baud: 3/12/24, online: 24 hrs SysOp: Mike Otto. TCB BBS. Using IBM AT for FIDO node 383/761, several message bases and download areas. Beta site for QuickBBS.

(501)273-2009 Bentonville. Baud: 3/12/24, online: 24 hrs SysOp: Ron Pelfrey. The Midnight Express. Using Quick BBS for MS-DOS, commodore 64/128,and Amiga. Online games.

(501)273-9257 Bentonville. Baud: 3/12/24, online: 24 hrs SysOp: Don Chick. The Chicken Coop BBS. Using TBBS 2.0S for online magazines, games and downloads for IBM and C'dore 128/64. Multiple msg. bases/classifieds.

(501)521-0547 Fayetteville. Baud: 3/12, online: 24 hrs SysOp: Mark Carter. MegaBoard. Using Red Ryder Host v1. for Macintosh and Apple II users but has MS-DOS download.

(501)565-3798 Little Rock. Baud: 3/12, online: 24 hrs SysOp: Rick Mobley. ROSBBS LR.

(501)568-9464 Little Rock. Baud: 3/12, online: 24 hrs (disk space = 50Mb) SysOp: Dale Miller. U.A.L.R. BBS. For messaging and CB. All computer users are welcome.

(501)636-2281 Rogers. Baud: 3/12/24, online: 24 hrs (disk space = 104Mb) SysOp: Jerry Hunter. DMC OnLine Telecomm. Using DMC 386 & RBBS for Supports IBM and Commodore. Confs: sysops, BBSads, CAD, CBM, Telcomm, buy & sell. Fees for downloads.

(501)735-9980 West Memphis. Baud: 3/12, online: 24 hrs SysOp: Michael Dorman. Midnight BBS. Sponsored by Mid-South TI-99/4A Users Group. For the T199/4A, Geneve 9640 and IBM computers.

(501)932-6949 Jonesboro. Baud: 3/12, online: 24 hrs. SysOp: Kevin Watkins. JUG BBSLS 123/13 p. Sponsored by Jonesboro User Group. For supports MS-DOS, Commodore, Atari, CoCo, CP/M and Geneology. Jonesbury UG member-supported system.

Arizona

(602)326-5629 Tucson. Baud: 3/12, online: 24 hrs SysOp: Dean Thornton. Liverpool Express. For both Apple and IBM.

(602)458-5420 Sierra Vista. Baud: 3/12/24, online: 24 hrs (disk space = 40Mb) SysOp: John Sebens. Sierra Vista BBS. For CPM files. Upload/download files. Message areas.

(602)459-6514 Sierra Vista. Baud: 300, online: 24 hrs SysOp: Bill Morris. Starbrite BBS. Using Atari for 4 message bases, public-domain files online, Avery library system, plus 3 jokes and they are funny!.

(602)582-3643 Phoenix. Baud: 3/12/24, online: 24 hrs. (disk space = 80Mb) SysOp: Dale Williamson. JCS BBS. Using 1.10 #87149 for 900+ files, Tech/Science/Current Events- Full line of computers/accessories/optical drives. 8-N-1.

(602)642-3845 McNeal. Baud: 3/12/24, online: 3pm to 9am SysOp: Owen Mayes. AERONET. For aircraft & aviation-related info, directories, ads and more. Free acoess, friendly, all welcome.

(602)842-4635 Glendale. Baud: 3/12/24, online: 24 hrs (disk space = 30Mb) SysOp: Charlie Parvin. The EXTERMINATOR BBS. Using Wildcat for multiple files, message areas. Dial-a-match. Adult. Educational.Games. E-Mail,more. Reg. required.

(602)843-6574 Phoenix. Baud: 3/12/24, online: 24 hrs SysOp: Stan Krawczyk. Amaz!-ing Connection. For All Amiga boards. PC-pursuitable.

(602)984-4049 Tempe. Baud: 3/12/24, online: 7pm to 7am (disk space = 32Mb) SysOp: Bob Jacobs. QuestNet BBS. For Rosicrucian fellowship & synthesis of science and religion. **PRACSA member.**

(602)995-1472 Phoenix. Baud: 3/12/24, online: 24 hrs (disk space = 64Mb) SysOp: Steve Irving. Nighthawk BBS. For PC-Pursuitable, supports ANSI color/graphics and a variety of computer types.

California

(209)474-7422 Stockton. Baud: 300, online: 24 hrs SysOp: John Swingle. SCUG BBS. Sponsored by **FOG** A.M.O. 139--Stockton Commodore 64 Users Group. Using Commodore.

(209)526-9987 Modesto. Baud: 3/12/24, online: 24 hrs SysOp: J Hill. Programmer's Retreat. Using Tandy 2000 for 110 Baud N-7-2, 3/12/2400 Baud N-8-1 or E-7-2. 20 Sub-boards, 2 file areas, IBM,CoCo,Atari,C-64 etc.

(209)754-5530 San Andreas. Baud: 300, online: 9:30pm to 6:30am SysOp: Larry Anderson. Silicon Realms. Sponsored by Mother Lode Commodore User's Group. Using C-64 for online games, Punter and X-modem download areas, Fantasy Role Playing game message bases.

(209)943-1880 Stockton. Baud: 3/12/24, online: 24 hrs (disk space = 40Mb) SysOp: Charles R. Hague. The Wrong Number. Using PCBoard 12.0/D for mainly MS-DOS, others welcome. Intelligent conversation. Next time, dial The Wrong Number!.

(213)423-4999 Long Beach. Baud: 3/12/24, online: 24 hrs (disk space = 101Mb) SysOp: Mark Bishop. Carrier-Point Info. Using CD ROM to PC for nine lines on rotary. Offering a large library of downloads and 40 channel CB sinulation. **PRACSA member.**

(213)431-2999 Seal Beach. Baud: 3/12, online: 24 hrs SysOp: Rod Chandler. Morning Star. Using RBBS for Christian-oriented BBS.

(213)542-6349 Torrance. Baud: 3/12, online: 24 hrs (disk space = 10Mb) SysOp: Brools Vogt. The Original B. Dalton with Jerry Feldman. Using IBM XT for on-line games and nine message bases for IBM, Atari, and Commodore.

(213)650-0519 Studio City. Baud: 3/12/24/96, online: 24 hrs SysOp: Lynzie Flynn. Lynzie's Motherboard. For 10 lines on rotary. Multi-user chat, downloads, E-mail, public boards. PC/Apple/Mac/Commodore/Atari.

(213)659-1982 Los Angeles. Baud: 3/12/24/96, online: 24 hrs SysOp: Lynzie Flynn. Lyknzie's Motherboard. For multiuser chat sysem, large download library. Grp and private chats. E-Mail/public. Local events.

(213)860-5649 Cerritos. Baud: 3/12, online: 24 hrs SysOp: David Olson. Online Goldmine. For trivia, and horoscope. Classifieds,electronic yellow pages. Prestel graphics protols with reg.

(213)933-4050 Torrence. Baud: 3/12/24, online: 24 hrs SysOp: Dave Harrison. The WESTSIDE. For 16 Lines with private and group chat, E-Mail, Match, 30 public message and game boards,library Sec.

(213)971-6260 Los Angeles. Baud: 3/12/24, online: 24 hrs (disk space = 10Mb) SysOp: Ed Grey. Grey Matter. Using PBBS for Televideo CP/M Timex/Sinclair Dialog Help. No MS-DOS files.

(408)238-9621 San Jose. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Al Mehr. SERVU. Using AMPRO & HBBS for CP/M80, CP/M86, Macintosh, PC-DOS, MS-DOS software. **PRACSA member.**

(408)245-1420 Sunnyvale. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Norman L. Beeler. ZEE Machine. Using Ampro & HBBS for public domain software. **PRACSA member.**

(408)247-1257 San Jose. Baud: 3/12, online: 24 hrs SysOp: K. Standifird. BAAUG BBS. Sponsored by Bay Area Atari Users Group. For Atari computer systems support.

(408)286-8240 San Jose. Baud: 3/12/24, online: 6pm to 6am (disk space = 12Mb) SysOp: David Hyatt. The Public Declaration. Using QX-10. **PRACSA member.**

(408)354-5934 Saratoga. Baud: 3/12, online: 24 hrs (disk space = 85Mb) SysOp: Chuck Metz. Saratoga PBBS. Using SD Z-80 & HBBS for Public domain software and technical information exchange. **PRACSA member.**

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Bulletin Board

(408)374-5140 Campbell. Baud: 3/12, online: 24 hrs SysOp: R.W. Brown. Gavilan User Group BBS. For Free Access.

(408)394-6234 Monterey. Baud: 24/12/3, online: 24 hrs. (disk space = 150MB) SysOp: Rick Lagerstrom. WESTLOG PREMUIM BBS. Using PC-Board for For MS-DOS compatible systems. 9 conference, 10 message bases.

(408)728-1636 Watsonville. Baud: 3/12, online: 24 hrs SysOp: Crescent Wizard C. Realm of Wonder. Using Apple //E for uploads/downloads.

(408)733-9341 Sunnyvale. Baud: 3/12, online: 24 hrs SysOp: Wallace Lin. Stock Market BBS. For forecasts on approx. 6000 stocks traded on the NYSE, AMEX and OTC. Free to new callers.

(408)842-5754 Gilroy. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Brian Sowders. The Gilroy BBS System. Using IBM XT for the promotion of telcomm. and enhancement of IBM Computers. PC library for U/Dloads, E-mail.

(408)899-1219 Monterey. Baud: 3/12, online: 24 hrs SysOp: Kurt Henke. Automated Multi-Media. Sponsored by Ft. Ord Commodore USers. Using AMME Jr. for MENSA and local users groups. Commodore up/download only.

(408)998-8927 San Jose. Baud: 3/12, online: 24 hrs (disk space = 32Mb) SysOp: Wild Bill Strouse. Enable Electronic BBS. Using XT & Collie.

(415)285-2687 San Francisco. Baud: 3/12, online: 24 hrs (disk space = 10Mb) SysOp: Bond Shands. KAY*FOG. Using Kaypro & Metal for Novices and subject (dBASE, WordStar, MEX, etc) conferences -- mail registration required. **FOG member.**

(415)361-1487 Redwood City. Baud: 3/12/24/96, online: 24 hrs (disk space = 232Mb) SysOp: Dick Worth. Emerald Lake (FOG 48). Using Wildcat! for complete and up-to-date FOG-CPM and FOG-DOS disk available. **PRACSA member.**

(415)365-7836 Redwood City. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Edward Hayes. BAHUG. For Heath / Zenith users. **PRACSA member.**

(415)366-6409 Redwood City. Baud: 3/12/24/96, online: 24 hrs. (disk space = 80Mb) SysOp: Roel Sarceno. Video ViSion BBS. Using Turbo XT & Wildcat for THE GRAPHIC LIBRARY with 16 file transfer protocols including Zmodem and live on-line games.

(415)552-9070 Corte Madera. Baud: 3/12, online: 24 hrs SysOp: Roy Levin. PCCUG BBS with Edwin Rutsch. Sponsored by IBM AT/XT Clone User Group. For Unique interractive support for buying and using computers also free book downloads.

(415)581-0449 Castro Valley. Baud: 3/12/24, online: 24 hrs (disk space = 40Mb) SysOp: Gordon French. The French Connection. Using Compupro for Goliath/ CALLME node 092. **PRACSA member.**

(415)591-6259 Belmont. Baud: 3/12/24, online: 24 hrs (disk space = 92Mb) SysOp: Roy Robinson. Mid-Peninsula BBS. Using clone & PC Board for CP/M & MS-DOS support. **FOG member.**

(415)723-7685 Palo Alto. Baud: 3/12/24, online: 24 hrs (disk space = 130Mb) SysOp: Greg Hulbert. SMUG BBS. Sponsored by. For huge library of Mac files,E-Mail. Supports the Stanford Mac Users Grp but all welcome.

(415)755-2030 Daly City. Baud: 3/12/24, online: 24 hrs (disk space = 94Mb) SysOp: Gale Rhoades. FOG # 1 with Jack Brown. Using Osborne & Metal for distribution of FOG Disk Library. FOG or PRACSA membership required for access to download area. **FOG member.**

(415)755-8315 Daly City. Baud: 3/12/24, online: 24 hrs (disk space = 11Mb) SysOp: Jack Brown. FOG # 6. Using XT clone * PICS for technical information and FOG uploads -- open to the public. **FOG member.**

(415)849-2684 Berkeley. Baud: 3/12/24, online: 24 hrs (disk space = 320Mb) SysOp: Raines Cohen. BMUG BBS. Sponsored by Berkeley Macintosh Users Group. Using Macintosh for Berkeley Mac User Grp members only. 6 phone lines in rotary. TBBS/Seadog. confer., plus CD-ROM.

(415)855-9548 Palo Alto. Baud: 3/12/24, online: 1:45 am to 10:39 p (disk space = 90Mb) SysOp: Bernard Aboba. MailCom. Using Opus for over 30 conferences including nation and Bay Area Macintosh conf.

(415)856-2771 Palo Alto. Baud: 3/12, online: 24 hrs (disk space = 3Mb) SysOp: Freeman Bradford. The Desktop Publisher. Using H-89 & NROS for hobby.

(415)927-1216 Corte Madera. Baud: 3/12/24, online: 24 hrs SysOp: Howard Leistner. MSPCUG BBS with Bill Ward. Sponsored by Marin Sonoma PC Users Group.

(415)938-9470 Walnut Creek. Baud: 3/12/24, online: 24 hrs (disk space = 66Mb) SysOp: Werner Gumpert. Co-Ed Associates with Pat Miller. Using Morrow MD11 & HBBS for Software exchange. **PRACSA member.**

(415)939-1246 Pleasant Hill. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Richard Hanson. CLUB 100. Sponsored by CLUB 100: Model 100 Users Group. For world's largest membership system dedicated to Radio Shack Model 100, 102, 200.

(415)948-2513 Los Altos Hills. Baud: 3/12/24/96, online: 24 hrs (disk space = 20Mb) SysOp: Irv Hoff. PRACSA. Sponsored by Public Remote Access Comp. Standard. Using Ampro & PBBS for PRACSA-member only system (9600 is Racal-Vadic). **PRACSA member.**

(415)948-6656 Los Altos. Baud: 3/12/24, online: 24 hrs (disk space = 22Mb) SysOp: David McCord. Z-Node Central. Using Ampro & Z-MSG for source of ZCPR3 software & support. **PRACSA member.**

(415)968-7369 Mountain View. Baud: 3/12/24, online: 24 hrs (disk space = 42Mb) SysOp: Jim Switz. SIGSIG (FOG #31). Using Ampro & Metal for PC-Pursuitable thru -408- node (dial 10-digit #). Message base, latest CP/M & MS-DOS P.D. software. **PRACSA member.**

(415)992-8542 Daly City. Baud: 3/12/24, online: 24 hrs (disk space = 45Mb) SysOp: Jack Brown. FOG # 3. Using PC-XT & PICS for FOG members, especially those using MS-/PC-DOS. **FOG member.**

(415)994-2944 Daly City. Baud: 3/12/24, online: 24 hrs SysOp: Vern Buerg. VOR. For IBM/compatibles. Large up/download file capacity. Home of the famous LIST utility.

(619)464-6271 San Diego. Baud: 3/12, online: 24 hrs (disk space = 30Mb) SysOp: John Folsom. Prides Crossing. Using DTK XT, EBBS/PC for file transfer for MS-DOS, Commodore, Amiga, Tandy, Apple/Mac, Atari. 10 msg. bases incl. b'cast. eng.

(619)486-1014 Poway. Baud: 3/12, online: 24 hrs SysOp: Vivian Lynes. Family Heirlooms RBBS. Using RBBS-PC for Genealogy and general purpose, E-mail, 15 Directories for Up and Downloading.

(619)789-6377 Ramona. Baud: 3/12, online: 24 hrs SysOp: Roger Williams. Back County PCBBS. For IBM/PC's and clones.

(707)253-8117 Napa. Baud: 3/12, online: 24 hrs (disk space = 30Mb) SysOp: Mike Peters. The Electronic Wall. Using RBBS-PC for IBM, others welcome. Online games, such as Tradewars.

(707)437-3597 Fairfield-Suisun. Baud: 3/12, online: 24 hrs SysOp: Chuck Warren. Neutral Zone BBS. For all computers welcome.

(714)536-7895 Costa Mesa. Baud: 3/12, online: 24 hrs (disk space = 10Mb) SysOp: Peter Wexler. The Wizard's Corner. Using public domain for Public-domain file transfer.

(714)839-9580 Westminster. Baud: 3/12/24, online: 24 hrs SysOp: Eric Drochner. PC-LAIR. For PC-DOS, MS-DOS. Large PD software library.

(714)989-7745 Rancho Cucamonga. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Ron Pothier. The Winery Atari BBS. Using Atari for online games, etc. for all users. Semi-private system. 13 message bases.

(805)322-8800 Bakersfield. Baud: 3/12/24, online: 24 hrs SysOp: Rick Heming. INTERCOMM with Jim Carter. Sponsored by Kern Independent PC User Group. Using Wildcat for members only!.

(805)399-1887 Bakersfield. Baud: 3/12/24, online: 24 hrs (disk space = 40Mb) SysOp: Jim Harrer. Mustang Wildcat! BBS. For Mustang Software-operated board, Games, Stock updates.

(805)925-4574 Santa Maria. Baud: 3/12/24, online: 24 hrs (disk space = 30Mb) SysOp: Warren Coykendall. The Data Exchange. Using XT clone.

(818)366-1238 Granada Hills. Baud: 12/24/96, online: 24 hrs (disk space = 160Mb) SysOp: Tom Tcimpidis. The MOG-UR'S EMS. Using AMI 386 for private/public mail, 24 SIGs, 26 file sections, multi-interest system open to all since 1981.

(818)446-5937 Arcadia. Baud: 3/12/24, online: 8am to 10pm (disk space = 80Mb) SysOp: Richard Smith. OKOK/RCPM - FOG SYS 36. Sponsored by **FOG** A.M.O. 84--Osborne Komputer Owners Klub. Using Osborne 1 & Metal. **FOG member.**

(916)243-0297 Redding. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Mike Farrar. Maturia BBS. Using supra/ ST Base for Atari 8-bit and ST support,file sig for Mac, online games, editorials, ST BBS listings.

(916)332-3422 Sacramento. Baud: 3/12, online: 24 hrs SysOp: Tony LaFrenier. Night Vision BBS with Sheryl LaFrenier. Using VISION for C-64 and C-128. Other computers also welcome. Downloads, on-line games, etc. Free and friendly.

Colorado

(303)465-3729 Broomfield. Baud: 3/12/24, online: 24 hrs SysOp: T.J. Connolly. PC Computer Brokers. Using RBBS-PC for uploads/downloads, messages, conferences.

(303)597-2743 Colorado Springs. Baud: 3/12, online: 24 hrs (disk space = 21Mb) SysOp: Kathy Bylkas. FOG #45. Sponsored by **FOG** A.M.O. 133--Colorado Springs Osborne Group. Using Osborne & Metal. **FOG member.**

(303)665-9152 Lafayette. Baud: 3/12, online: 24 hrs SysOp: Harold Piser. Randolph Society Info. Using PC-XT, TBBS for Religion, Philosophy, Holistic Health, Environment roundtable discussions.

(303)671-7669 Denver. Baud: 3/12/24, online: 24 hrs SysOp: Jay Melnick. Colorado Travel Bank. For year-round Colorado Travel/Recreation Info., Individual Ski Area Reports, Weather Forcasts. Free.

(303)680-7209 Aurora. Baud: 3/12, online: 24 hrs SysOp: Ted Williams. SOUND DOCTRINE BBS. For serious christianity.(Christian & non-Christian welcome). Discussions. Order free tapes and materia.

(303)978-0298 Littleton. Baud: 3/12/24, online: 24 hrs (disk space = 30Mb) SysOp: Ron Sellers. RSS.BBS. For Supporting 8-bit Atari since 5/83. Movies online. 8/N/1.

(719)574-2567 Colorado Springs. Baud: 3/12, online: 24 hrs SysOp: Joe Nuvolini. Villa-TI. Sponsored by Front Range 99'er Computer Club. For all welcome. Sponsored by Front Range 99'er Computer Club.

Connecticut

(203)366-1336 Bridgeport. Baud: 3/12/24, online: 24 hrs SysOp: Jim Ryan. The Silver Screen with Bill Wonneberger. Using Billboard for modem help.Fido/ Opus/ SEAdog/ Binkley/ Billboard support files,user group newsletter articles.

(203)456-1933 Willimantic. Baud: 3/12/24, online: 24 hrs SysOp: Dean Petix. The Willi-Board BBS. For member of FidoNet, IFNA.

(203)481-5538 Branford. Baud: 12/24, online: 24 hrs (disk space = 40Mb) SysOp: Chuck Spear. The PC Network. Using TandySX1000 & FIDO. **FOG member.**

(203)484-4637 Northford. Baud: 3/12/24, online: 24 hrs (disk space = 44Mb) SysOp: Frank Whitman. Whitman Software Sys. Sponsored by **FOG** A.M.O. 54--Yankee Osborne Users Group. Using Osborne 1 & PBBS for CP/M and MS-DOS general interest and utility programs. **FOG member.**

(203)634-0370 Meriden. Baud: 3/12, online: 24 hrs (disk space = 40Mb) SysOp: Ray Kaliss. P. C. Trader Project. For The PCT PROJECT-Sysop connection. For any sysop. IBM files, messages, Hardware/user supported s'ware.

(203)698-0588 Old Greenwich. Baud: 12/24/96, online: 24 hrs SysOp: Jim Bolster. StarPort. For Astronomy-Space related.

(203)783-9597 Milford. Baud: 3/12/24, online: 24 hrs (disk space = 80Mb) SysOp: Jay Ferron. ProDOS News BBS. Using Apple //gs for online games, u/d-loading, casino, stock market, simulations, role-playing, etc.

(203)791-8532 Danbury. Baud: 3/12/24/96, online: 24 hrs SysOp: Don Dawson. Treasure Island OPUS. Using OPUS 1.0 for Fido/Matrix Echomail, games, MS-DOS and OPUS utils, conferences (node 141/730). DAUG member.

(203)791-8838 Danbury. Baud: 3/12/24/96, online: 24 hrs SysOp: Gary Snider. Rocky Road. Using OPUS 1.0 for MS-DOS utilities, ANSI graphics and tools, games and conferences (node 141/740).

(203)846-6728 Norwalk. Baud: 3/12, online: 24 hrs SysOp: John Krause. TRS-80 FCUG. Using TBBS for Supporting TRS-80 AND MS-DOS, Local message base,open to all.

District of Columbia

(202)488-4709 Washington. Baud: 12/24, online: 24 hrs (disk space = 80Mb) SysOp: Mark Findlay. Home-DBA. For IBM/Sanyo. 9 confs, incl. Foreign language, graphics, telegaming and jokes. PC Pursuitable.

Delaware

(302)736-6848 Dover. Baud: 3/12/24, online: 24 hrs (disk space = 180Mb) SysOp: Thom MacDonald. COM-DAT Product. Using Wildcat! for supports IBM, Commodore etc. Files for downloading, products at wholesale, tech support and more.

Florida

(305)268-3690 Titusville. Baud: 3/12, online: 24 hrs SysOp: Georg Constandakis. Alien UFO BBS. Sponsored by Alien UFO User Group. For all computers.

(305)279-6223 Miami. Baud: 3/12/24/96, online: 24 hrs (disk space = 45Mb) SysOp: Eric Shore. USA RCPM/RDOS. Sponsored by **FOG** A.M.O. 26--Gold Coast Computer Group. Using Vixen & Metal. **FOG member.**

(305)338-8486 Pompano Beach. Baud: 3/12/24, online: 24 hrs (disk space = 40Mb) SysOp: Bill Wright. PC Logic Wildcat!. Using Ver. 1.10 At clone for ham radio and communications oriented. PC pursuitable.

(305)434-4927 Cooper City. Baud: 3/12/24, online: 24 hrs (disk space = 30Mb) SysOp: Steve Schneider. The Rainforest BBS. For Diverse Message, 600k of Humor Files, Game Section On-Line.

(305)453-0079 Merritt Island. Baud: 3/12, online: 24 hrs SysOp: Ted Grachis. Nova BBS.

(305)486-1065 Ft. Lauderdale. Baud: 3/12, online: 24 hrs SysOp: Roy Sweeney. Ross Shop-

Bulletin Board

pers. For online computer shopping, upload/download, multiuser system. NOTE: new phone number!.

(305)524-5973 Fort Lauderdale. Baud: 3/12, online: 9pm to 6am SysOp: Robert Bouchard. National Locksmith's. For technitips, bulletin boards, message boards, up/downloads. Sponsored by Bouchard & Masters, Inc.

(305)622-7049 Palm Beach Gardens. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Rod Molina. Amigalink. Using Amiga for Amiga dedicated system w/c has been up since 6/86, a respectable base of Amiga users and files.

(305)785-7417 Pompano Beach. Baud: 3/12/24, online: 24 hrs (disk space = 60Mb) SysOp: Ed O'Neill. Channel 8250. Using PC Board 12.1.

(305)791-9574 Hollywood. Baud: 3/12/24, online: 24 hrs (disk space = 60Mb) SysOp: Terry Windmiller. PHOENIX BBS. Using RBBS 15.1a for For support of ATT 6300 and compatibles,Public domain software library.

(813)299-5694 Winter Haven. Baud: 3/12, online: 24 hrs SysOp: John Farrell. ZBBS. For By and for Zbasic Programmers. Support for WENDIN Dos/MS-DOS, CPM. TRSDOS, APPLE, MACINTOSH.

(813)385-2472 Lakeland. Baud: 3/12, online: 24 hrs SysOp: John Farrell. Z-BBS. For By and for ZBasic Programmers. MS/DOS,CPM,TRS/DOS, APPLE, MACINTOSH, AND WENDIN DOS.

(813)421-2341 Davenport. Baud: 300, online: 7pm to 6am SysOp: Derek Rayburn. R.C. BBS #2. Using C-64 for all computer users.

(813)681-2008 Valrico. Baud: 3/12/24, online: 24 hrs SysOp: Adam Baldwin. The John Galt Line.

(813)683-0214 Lakeland. Baud: 3/12, online: 24 hrs (disk space = 50Mb) SysOp: Chris McLaughlin. Termnet. Using IBM-XT for Games, downloads, business programs and more. Open to all computer users free of charge.

(813)684-5248 Brandon. Baud: 3/12, online: 24 hrs SysOp: Adam Baldwin. MasterDate. Using Oracomm #28 for Oracomm #28 also.

(813)726-3449 Safety Harbor. Baud: 3/12, online: 24 hrs (disk space = 3.5Mb) SysOp: Thomas Davis. The Harbor Lights. Sponsored by Pinellas Atari Computer Enthusiasts. Using Atari 130XE for supporting Atari 8-bit.

(813)753-0335 Bradenton. Baud: 3/12/24, online: 24 hrs (disk space = 60Mb) SysOp: Keith Wolfe. Space Age BBS. For Amiga, Apple, Atari, Commodore, IBM, Tandy. Public message base, chat, grp chat. up/down load.

(813)862-8806 Port Richey. Baud: 3/12, online: 24 hrs SysOp: Ralph LoBianco. Studio-64. For a Commodore BBS & Online Store.

(813)869-3700 Hudson. Baud: 3/12/24/96, online: 24 hrs (disk space = 250Mb) SysOp: Herb Mellinger. Silicon Lab. For Featuring MS/PC-DOS,over 2000 files.

(813)924-7113 Sarasota. Baud: 300, online: 24 hrs SysOp: Pearl Oberweger. Suncoast Shopping. For Online shopping featuring public domain solutions,computer goods,and more. For all users.

(904)260-9283 Jacksonville. Baud: 1200, online: 24 hrs. SysOp: George Frena. Jacksonville SportOnln. For Sports article, public domain software, online games, Runs PC Board software.

(904)262-6696 Jacksonville. Baud: 3/24, online: 24 hrs (disk space = 40Mb) SysOp: Roy Mahler. The Foreclosure. Using PC Board ver.11.8e for Real estate and other investments. Specializing in over 600 foreclosed properties fr. 4 major Co.

(904)268-4845 Jacksonville. Baud: 2400, online: 24 hrs (disk space = 680Mb) SysOp: Blaine Brodka. The Outer Limits BBS. For PC-SIG library disks online.

(904)378-4296 Gainesville. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Robert L Thibodeau. Sat/Com BBS]I[. Using Apple //GS for 8 major brands of computers w/SIGs and XMODEM downloads for each. 30 interactive games, articles.

(904)682-1620 Crestview. Baud: 3/12/24/96, online: 24 hrs SysOp: Ben-z Lawrence. The Wizards' OPUS BBS. Using OPUS, Fido for IBM, Amiga, C programming, general interest and others. Visiting sysops have sysops conference.

(904)862-9156 Ft. Walton Beach. Baud: 3/12/24/96, online: 24 hrs. (disk space = 30Mb) SysOp: Jim Young. 221B Baker Street. Using At-class,Opus1.036 for MS-DOS, ANSI Graphics, Coleco Adam Sig (Echo Mail), Fido Net 366,221. Multiple messages. Free system.

(904)862-9558 Ft. Walton Beach. Baud: 3/12/24, online: 24 hrs (disk space = 60Mb) SysOp: Bruce Aplin. GBBS.PRO BBS. Sponsored by FWB Apple Users Group. Using Apple IIgs, GBBS. for general interest. games,AD&D, G-files, E-Mail, up/down loading.

Georgia

(404)252-8810 Atlanta. Baud: 12/24, online: 24 hrs SysOp: Dr. D.B. Adams. Psychology OnLine. Using PC-BOARD for Conferences only. Registration required.

(404)354-0662 Nicholson. Baud: 3/12, online: 24 hrs (disk space = 10Mb) SysOp: Bob Herrin. FOG #27 with Scott Hartlage. Using Kaypro & Metal. **FOG member.**

(404)546-8256 Athens. Baud: 3/12, online: 24 hrs SysOp: Ric Helton. Freestyle! with Jim Maddox. For Atari.

(404)625-0065 Calhoun. Baud: 3/12, online: 7pm to 6am SysOp: Brian Cagle. R.C. Creations BBS. Using C-128 for all computer users.

(404)733-3192 Augusta. Baud: 3/12/24, online: 24 hrs SysOp: Hugh Echols. FOUR-ACES. Sponsored by. For Atari computer enthusiasts.

(404)790-8492 Augusta. Baud: 3/12, online: 24 hrs SysOp: Girard McGruder. G.A.M. For X-rated Adv. Great information.

(404)796-3805 Hephzibah. Baud: 3/12, online: 24 hrs SysOp: Stan Sharp. Garden City Oasis. For TRV,SUR,GAM,ETC.

(404)991-6250 College Park. Baud: 3/12, online: 24 hrs SysOp: James A. Fairchild. 99er BBS. Sponsored by Atlanta TI-99/4A Computer Users Grp. For (7-E-1) TI 99 users, all.

(912)431-0836 Albany. Baud: 3/12/24, online: 24 hrs (disk space = 33Mb) SysOp: Joe Hintz. The DOS Connexion with Lloyd Graham. Using ROS-BBS for MS-DOS download area and message area.

(912)552-5600 Tennille. Baud: 3/12, online: 12pm to 6am SysOp: Ralph Peterson. Computer Club:Sharewar. Using IBM/Comp for up/download ShareWare progs. Registration is required.IBM/Comp computers.

Iowa

(319)351-6533 Iowa City. Baud: 3/12/24, online: 24 hrs SysOp: Al Hoffman. Darkness. Using Opus for general interest, with emphasis on programming and programs for blind users. 7/N/1.

(515)265-6748 Des Moines. Baud: 3/12, online: 24 hrs SysOp: Al McCartney. Data Elite. Using Apple for all computers, message board, classified ads, voting, upload/download, online games.

(515)964-7937 Des Moines. Baud: 3/12, online: 24 hrs (disk space = 40Mb) SysOp: Dan Buda. FOG-Line BBS. Sponsored by **FOG** A.M.O. 12--Midwest FOG. Using IBM & Fido.

Idaho

(208)237-6935 Pocatello. Baud: 3/12/24, online: 24 hrs (disk space = 30Mb) SysOp: Dale Lloyd. The Grand Keyboard with Keith Kendall. Using RBBS-PC.

(208)587-7603 Mountain Home. Baud: 3/12/24, online: 24 hrs (disk space = 60Mb) SysOp: C. Walden. Rattlesnake Station. Using Atari 520 Michtron for message base, up/downloads, supports Atari ST, 8-bit, Macintosh, Commodore 64/128, IBM. All welcome.

Illinois

(217)333-8301 Champaign. Baud: 3/12/24, online: 24 hrs (disk space = 40Mb) SysOp: Greg Russell. Hacker's Anonymous. Using PC with FIDO for MS-DOS, Apple, Commodore, etc. Operated under cooperation with IBM's project EXCEL at Univ. of IL.

(217)344-4032 Urbana. Baud: 3/12/24, online: 24 hrs (disk space = 25Mb) SysOp: Jonathan Block. FOG #14. Using Osborne & Metal. **FOG member.**

(309)266-9842 Morton. Baud: 3/12/, online: 9 pm to 9 am SysOp: Dave Burleson. Proteus Network. Using Tandy 1200,OPUS.

(309)346-1134 Pekin. Baud: 3/12, online: 24 hrs SysOp: Charlie Hickey. charlies. Using Tandy 1000, OPUS.

(309)346-7736 Pekin. Baud: 3/12/24, online: 24 hrs SysOp: Carl Frazier. Access Info system. Using Tandy 1000SX.

(309)347-1268 Pekin. Baud: 3/12/24, online: 24 hrs. SysOp: James Segler. Space Walker. Using Tandy 1000SX,WILDC for all files are on ARC form. 13 areas to chose from.

(309)347-2187 Pekin. Baud: 3/12/24, online: 24 hrs SysOp: Neil Beiersdorf. PEORIA CECS #2. Using IBM Clone.

(309)379-2156 Stanford. Baud: 3/12/24, online: 24 hrs SysOp: Kevin Wonders. The Slice of Life. Using Apple & GBBS Pro for Insults unlimited, Computer Chip, Classified Ads, Appleworks, Music & Movies.

(312)235-7902 Chicago. Baud: 3/12/24, online: 24 hrs (disk space = 55Mb) SysOp: Bill Kuykendall. CFOG II with Ben Cohen. Sponsored by **FOG** A.M.O. 80--Chicago's First Osborne Group. Using Osborne & Metal. **FOG member.**

(312)323-4711 Hindsdale. Baud: 3/12/24, online: 24 hrs SysOp: Timothy Shea. In The Dog House South. For IBM, Atari, Apple, Commodore, Mac.

(312)356-6897 Lake Villa. Baud: 3/12, online: 24 hrs SysOp: Paul Berker. Nessy Games System with Phyllis Berker. Using Apple IIE for Game menu w/ various adventure text games,NFL Football text game,etc.Message base also available.

(312)430-4234 Burbank. Baud: 3/12/24, online: 24 hrs (disk space = 30Mb) SysOp: Tim Orosz. Rune Quest BBS. Using BBS Express for role-playing games, microleague baseball, up/downloading for Atari ST.

(312)622-4442 Chicago. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: George Matyaszek. Chicago Syslink Net. Sponsored by Chicago Area Computer Hobbyist Exch. For multi-user, online chat, Micromatch/Find-A-Friend, INFO-MAT weekly magazine, much more. **FOG member.**

(312)743-7729 Chicago. Baud: 3/12/24, online: 24 hrs SysOp: Vaishnava Dasa. The Hare Krishna BBS. Using RBBS for Those who have an interest in the Vedic philosophy of Krishna. Open to the public & new users,No fee.

(312)762-8678 Chicago. Baud: 3/12, online: 24 hrs (disk space = 24Mb) SysOp: Bruce Wenzloff. Synergy Information Ex. For all computers to participate. No fee.

(312)777-9480 Chicago. Baud: 300, online: 6pm to 6am (disk space = 1Mb) SysOp: Kevin Keyser. The Round Table. Using Commodore for Some downloads useing PUNTER protocol. Extensive library section containing articles.6messages base.

(312)881-3799 Buffalo Grove. Baud: 3/12, online: 24 hrs SysOp: Jim McGreal. Fandoms Electronic Con. Using Com for Comic World News Buy Sell Trade.

(312)974-3123 Palos Hills. Baud: 3/12/24, online: 24 hrs (disk space = 50Mb) SysOp: Mike Miller. Night Net BBS. Using Atari for Atari 8-bit and ST systems. 6 message bases, Atari tech support our specialty. Member of S.W.A.T.

(618)398-5703 Belleville. Baud: 3/12/24/96, online: 24 hrs (disk space = 100Mb) SysOp: Gordon Anson. The Wizard's Lair. Using PCBoard 11.8a for Online games, IBM, ATARI-ST, AMIGA, COMMODORE 128, Open Access w/ free utse of Mail facalities.

(618)744-0467 SAFB. Baud: 3/12/24, online: 24 hrs (disk space = 65Mb) SysOp: Michael MacNessa. The Emerald Keep II. Using Amiga 100,Citadel for over 10 megs of Amiga PD U/D loads. You need to hit returns as soon asthe system answers.

(815)385-5031 McHenry. Baud: 12/24 8N1, online: 24 hrs SysOp: Bob Walker. The McHenry BBS. Using PCBoard for no-fee boards. All callers welcome.

(815)429-3533 Donovan. Baud: 3/12/24, online: 6pm to 6am SysOp: Wayne Burgess. Alternative Universe. For IBM, Commodore, and TI computer support. Large download section.

(815)544-5836 Belvidere. Baud: 3/12, online: 24 hrs SysOp: Bob Adams. Mistic System. For C.B. chat system. 4 phone lines. Free demo time.

Indiana

(219)223-8107 Rochester. Baud: 3/12, online: 24 hrs SysOp: Mark Timbers. Manitou BBS. Sponsored by Rochester Commodore Computer Club. For downloads for ATARI.Full system access on first call! For Zmagazine, BBS telecomputing News.

(219)255-2627 Mishawaka. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Greg Crouch. FORUM FIVE OPUS. Using Sanyo MBC 550/555 for Sanyo 550/555 support & downloadable files, echoed wantads, Member: National Sanyo Echo Conference.

(219)277-5565 South Bend. Baud: 3/12, online: 24 hrs SysOp: Laura Smedley. MOM'S BBS with Buddy King. Using TRS-80 TBBS for supports Radio-Shack, Commodore, Apple, Atari files. SIGs for SwapShop, Rock&Roll oldies and more.

(219)277-8599 Michiana. Baud: 3/12, online: 24 hrs SysOp: T Jones. Network 23. Using CoCo3.

(219)287-4326 South Bend. Baud: 3/12/24, online: 24 hrs SysOp: Bob Heide. Treasure Chest BBS. Using FidoNet 227/3 for MS-DOS/Apple/Commodore SIGs, National FidoNet echoed messages, online games. Mail reg. for msg & dl.

(219)696-3415 Lowell. Baud: 3/12/24, online: 24 hrs SysOp: Ken Prevo. dBASICs Toolkit. Using Eagle PC PC Board for specialty:MicroSoft Basics-Btrieve. Also product support and upgrades ot Shareware.

(219)938-3940 Gary. Baud: 3/12/24, online: 24 hrs (disk space = 64Mb) SysOp: Nick Hard. T.A.C.O. BBS. Using AtariST/ExpressST for Supports Atari ST computers. Online games, file area for IBM/clones. No validation needed to d/load.

(317)452-1535 Galveston. Baud: 3/12/24/96, online: 24 hrs SysOp: Tony Capoccia. Bible Bulletin Board.

(317)462-1461 Greenfield. Baud: 12/24, online: 24 hrs (disk space = 60Mb) SysOp: Gary Davis. The Gold Mine. Using PC Board 11/206 for Open to the public but download is only available to paying member $15-$45.

(317)631-9942 Indianapolis. Baud: 300, online: 24 hrs SysOp: Steve Simms. Hoosier Users Group. Sponsored by Texas Instrument Hoosier User Group. Using TI-99/4A Cal/Tech for users of Texas Instruments 99/4A computers ONLY.

Bulletin Board

(317)787-6748 Indianapolis. Baud: 12/24, online: 24 hrs SysOp: Linda Thompson. MOTHERBOARD. Using FidoNode 11/201 for IBM computers, caters to story writers and people with opinions, law conference, Fidomail, echomail.

(317)862-5966 Indianapolis. Baud: 3/12/24, online: 24 hrs SysOp: Tony Moleta. Ind. Computer Society. Sponsored by IBM PC Users Group, Inc. For MS-DOS.

(812)283-5182 Jeffersonville. Baud: 3/12/24, online: 4:30p to 7am (disk space = 124Mb) SysOp: Jim Brown. The Micro-Board System. For 8/N/1, Validation is Required for full access to system.

(812)477-5343 Evansville. Baud: 3/12/24, online: 24 hrs (disk space = 65Mb) SysOp: Ben H. Nation. NationServ. Sponsored by Nationserv Users Group. Using Tandy 1200HD, TBBS for IBM, Commodore, Tandy, & others. Up/downloads available, plus online games. Home of US BBS listings.

(812)985-9443 Evansville. Baud: 3/12/24, online: 24 hrs (disk space = 60Mb) SysOp: Gary Barr. Digicom BBS. Using Michtron for IBM, Amiga, Atari 8/16-bit, Apple, Tandy and C-64. 16 online SIGS, movie reviews, text libs & more.

Kansas

(913)334-5511 ??. Baud: 3/12, online: 24 hrs (disk space = 10Mb) SysOp: Bob Tate. K.C.K.C.C. Using RBBS 14.1 for IBM and compatibles. **GKCSA member.**

(913)341-4553 Overland Park. Baud: 3/12/24, online: 24 hrs (disk space = 40Mb) SysOp: D Gerrity. KC R-HP UG. Using RBBS 14.1 for IBM and compatibles. Hewlett Packard Users Group. Mail in registration required for full access. **GKCSA member.**

(913)362-9583 Shawnee Mission. Baud: 3/12/24, online: 24 hrs (disk space = 150Mb) SysOp: N Djajich. Heath UG #1. Sponsored by Microcomputer Users Group. Using RBBS 14.1 for IBM and compatibles. 2 on lines. **GKCSA member.**

(913)422-7345 ??. Baud: 3/12/24, online: 24 hrs (disk space = 31Mb) SysOp: J Rickey. COSMIX STA. Using RBBS 15.1 for IBM and compatible. Voice or other verification required for full access. **GKCSA member.**

(913)469-2301 ??. Baud: 3/12/24/19, online: 24 hrs (disk space = 120Mb) SysOp: Jeff Kosko. JCCC BBS #1. Using PCBD 12.1 for IBM and compatibles. Mail in registration required for full access. 7 on lines. 19200 Fastcomm. **GKCSA member.**

(913)492-2089 Overland Park. Baud: 3/12/24, online: 24 hrs (disk space = 44Mb) SysOp: R Kern. SMART SYS #1. Using PCBD 11.8 for IBL and compatibles.2 on lines.Voice or other verificsation req. for full access. Semi-private. **GKCSA member.**

(913)492-7291 Overland Park. Baud: 3/12/, online: 7 pm to 7 am SysOp: B Crosier. TANDY BBS. Using RBBS 14.1 for IBM and compatibles. Voice or other verification required for full access. **GKCSA member.**

(913)539-9312 Manhattan. Baud: 3/12, online: 24 hrs (disk space = 240Mb) SysOp: Dennis Haza. Flint Hills BBS. Using AT clone, PC-Board for IBM & compatibles.

(913)621-4354 ??. Baud: 3/12/24, online: 24 hrs (disk space = 95Mb) SysOp: Takestani. DONNELLY CO. Using PCBD 12.1 for IBM and compatible. Mail in registration required for full access. **GKCSA member.**

(913)642-7401 ??. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: G Miller. EXCALIBUR. Using TBBS2.0 for IBM and compatibles. Voice or other verification required for full access. **GKCSA member.**

(913)642-8479 ??. Baud: 3/12/24/96, online: 24 hrs (disk space = 80Mb) SysOp: M Russell. EPSON-NET. Using UBBS-II for IBM and compatibles. 9600 is US Robotics. **GKCSA member.**

(913)764-6451 ??. Baud: 3/12/, online: 10 pm to 7 am (disk space = 1.2Mb) SysOp: P.J. Slicer. MANHATTAN. Using TI-Net for TI and compatibles. 1200 Baud is even parity,7 data bits, 1 stop bit. **GKCSA member.**

(913)825-6830 Salina. Baud: 3/12, online: 7pm to 9am SysOp: Sam Laffere. Computer Connection. For Atari ST, Atari 8-bit, Commodore, MS-DOS.

(913)829-5417 ??. Baud: 3/12/24, online: 24 hrs (disk space = 40Mb) SysOp: T Leckbee. TEL-KC. Using RBBS 15.1 for IBM and compatible. Voice or toher verification required for full access. Optional sub. available. **GKCSA member.**

(913)831-4111 ??. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: John Floyd. MID-AMERICA. Using RBBS 15.1 for IBM and compatibles. **GKCSA member.**

(913)888-4918 ??. Baud: 3/12, online: 9 pm to 7 am (disk space = 20Mb) SysOp: J Portche. KC-BBS. Using RBBS 15.1 for IBM and compatibles. **GKCSA member.**

Kentucky

(502)241-4109 Crestwood. Baud: 3/12/24, online: 24 hrs (disk space = 60Mb) SysOp: Curt Edwards. Soft Stone. Using XT clone & RBBS for FOG Remote System #24. **FOG member.**

(502)678-5292 Glasgow. Baud: 300, online: 24 hrs (disk space = 1Mb) SysOp: Larry Stell. Better BBS of KY.

(502)843-2159 Bowling Green. Baud: 3/12, online: 24 hrs SysOp: Scott Bowerman. The SILO COLOR 64 BBS. Sponsored by Bowling Green Commodore Users Group. For support of all computers, color for Commodore. On line games, 18 subs, 10DLs.

(502)933-1029 Louisville. Baud: 300, online: 8pm to 7am SysOp: Earl Randall. The Crimlans Keep. Using Commodore for Commodore only board.

(502)937-5450 Valley Station. Baud: 3/12/24, online: 24 hrs (disk space = 30Mb) SysOp: Tom Currie. Volunteer BBS. Using Heath 148, GT-1300 for volunteers interested in Disaster/Emergency Services. No programs online, but text files welcome.

(502)964-2924 Louisville. Baud: 3/12, online: 24 hrs SysOp: Rich Link. The Atari Scene!. Using Atari 8 bit ST.

(606)269-1565 Lexington. Baud: 3/12/24/96, online: 24 hrs SysOp: Dr. Don Bodley. PROF-BBS. For specializing in Real Estate, Finance and Business P/D & Shareware for IBM-compatibles. 1000+ files.

(606)276-2910 Lexington. Baud: 3/12, online: 24 hrs (disk space = 40Mb) SysOp: Robert Bowles. NOVA STAR BBS. Using Genesis-PC for IBM PC, all Atari, and C-64/128 computers. Online trivia.

(606)325-3736 Ashland. Baud: 3/12/24, online: 8pm to 6am (disk space = 20Mb) SysOp: David Richmond. FLEXISOFT User Support. For IBM, CP/M, Kaypro, Xerox 820, and big Board-1 support. Free documentation, demos. Open access.

(606)781-4478 Southgate. Baud: 3/12/24/96, online: 24 hrs (disk space = 40Mb) SysOp: Ron Otto. Ruppel-Set II. Using PCBoard 12.1 for specializing in Desktop Publishing, HP Laser Jet utilities, Ventura 1.1.

(606)843-6207 East Bernstadt. Baud: 3/12, online: 11pm to 8am (disk space = 800K) SysOp: W.H. Lambdin. The Secret Kingdom. Using Commodore for Punter, XMODEM and ASCII up/downloading. Call with a color terminal. Voting booth & msgs.

Louisiana

(318)222-3503 Shreveport. Baud: 3/12/24, online: 24 hrs. SysOp: Daniel Tobias. Louisiana. Using OPUS, FidoNet380/2 for Includes 14 diff. msg. areas, downloads for MS-DOS,C-64, Apple, Fido/OPUS utilities, online games.

(318)281-7735 Bastrop. Baud: 3/12/24, online: 24 hrs SysOp: Pat McMullan. THE I/O BUS BBS. Using RBBS for downloads for IBM,TRS-80, Commodore, Atari, TI & Apple. Conferences, jokes,IBM & Ham.

(318)396-4627 West Monroe. Baud: 3/12, online: 24 hrs (disk space = 40Mb) SysOp: Danny Bray. The Missing Link with Dewayne Duncan. Using Tandy 1000SX for IBM and Commodore, but all welcome.

(318)397-1639 West Monroe. Baud: 3/12 8/N/1, online: Fri-6pm to Mon-6am SysOp: Dewayne Duncan. Dial-Your-Match #585 with Danny Bray. Using C-128.

(318)397-2546 West Monroe. Baud: 3/12/24, online: 24 hrs SysOp: Carol Hodo-Slone. The ASCII Gazette with Del Slone. Using Tandy 1000 Collie for multiple discussion areas, MS/DOS files.

(318)628-2087 Winnfield. Baud: 300, online: 7pm to 7am CST SysOp: Michael May. M&M BBS. For Commodore or ASCII computers. Demo system for M&M BBS software. Satellite TV info, 6480 modem pgms.

(504)241-5673 New Orleans. Baud: 3/12, online: 24 hrs SysOp: Emile Gardette. The SchoolHouse BBS. Using Oasis for Atari.

(504)242-0607 New Orleans. Baud: 3/12/24, online: 24 hrs SysOp: Tony Johnson. The WWIV CC-TUG BBS. Using BBS V1.6 for IBM, Commodore, Tandy and Apple computers.

(504)244-0768 New Orleans. Baud: 3/12, online: 24 hrs SysOp: Michael Combe Jr. Milliways BBS. For online trivia games and local Sci-Fi con info. Large message system. Aliases prefered.

(504)340-8172 Marrero. Baud: 3/12/24, online: 24 hrs SysOp: Paul Arnold. TI-Net #4. Using TI-99/4A for TI-99 and other computers.

(504)466-0908 Kenner. Baud: 3/12, online: 24 hrs (disk space = 40Mb) SysOp: Roy Musacchia. The Bowling Alley BBS. Using RBBS 15.1B for IBM, APPLE, MAC, Atari, Commodore, Z-100, TI.

(504)626-7819 Mandeville. Baud: 300, online: 24 hrs SysOp: Richard Auxilien. The Omega Network. For Commodore and MS-DOS users.

(504)737-8246 River Ridge. Baud: 3/12, online: 24 hrs SysOp: David Ethridge. Computer Automated BBS. For non-alias info, discussion. 19 active conferences,business, bulletins,etc.

(504)851-4857 Houma. Baud: 3/12/24, online: 24 hrs SysOp: Tim Burcham. The Curtain Call BBS. For MS-DOS, Apple, CoCo, Mac, C'dore, Atari. Fido & Seadog Net 384/2, National Confs and On-line games.

(504)861-8550 New Orleans. Baud: 3/12/24, online: 24 hrs SysOp: David Charbonnet. DCI's RBBS System. Using Capitol RBBS v15.1 for sharing information particular to IBM-compatibles.

(504)868-0938 Houma. Baud: 3/12/24, online: 24 hrs SysOp: Raymond Barnes. The Databank BBS. For MS/DOS, Apple, Macintosh, Atari, Amiga, CoCo, Commodore. National conferences and Online games.

(504)943-1508 New Orleans. Baud: 3/12, online: 12 am to 12 pm (disk space = 20Mb) SysOp: Michael Jones. KORG DSS-1 Users Group. Sponsored by ST Users Group. For Supports MIDI,Atari,IBM,Atari 8 bit.

Massachusetts

(413)736-0667 Springfield. Baud: 3/12, online: 24 hrs SysOp: Edward Goldberg. Mass. Gold Mine. Sponsored by Pioneer Valley 99/4A Users Group. Using TI-99/4A for Download sections for IBM, TI, Commodore, Atari, Apple.

(617)288-4667 Boston. Baud: 3/12, online: 24 hrs (disk space = 35Mb) SysOp: John Kinsella. Bar-Ken (FOG 29) with Barbara Kinsella. Sponsored by **FOG** A.M.O. 122--Boston Osborne Group (BCS SIG). Using Osborne & Metal. **FOG member.**

(617)889-0777 North Chelsea. Baud: 3/12/24/48, online: 24 hrs (disk space = 42Mb) SysOp: Robert Bohn. Lion's Den. For games,stock market,& casino. 26 mesages boards. 2 lines.

Maryland

(301)384-6805 Annapolis. Baud: 2400, online: 24 hrs SysOp: Ron Leung. Annapolis Chameleon. Sponsored by Chameleon Users Group.

(301)521-3107 Randallstown. Baud: 3/12/24, online: 24 hrs SysOp: Matthew Haynes. Midnight Express. Using PCBD 12.1/D for file base,doors. Registration online.

(301)694-3684 Frederick. Baud: 3/12, online: 24 hrs SysOp: Nora Charles. The BAUDLINE Too. For over 20 online games. No registration/subscription necessary.

(301)694-7108 Frederick. Baud: 3/12/24, online: 24 hrs SysOp: Drew Bartorillo. Baudline II. For IBM downloads, online games. Registration necessary.

(301)762-1490 Gaithersburg. Baud: 3/12/24/96, online: 24 hrs (disk space = 110Mb) SysOp: Jim Kay. The Flying PC AT. Using Opus for growing national & international echo conferences. Thousands of files for MS-DOS (9600 PEP).

(301)862-2770 Lexington Park. Baud: 3/12/24, online: 9pm to 3am (disk space = 20Mb) SysOp: Lewis Reyna. Bytes Unlimited! BBS. Using FoReM ST software for Atari ST, 8-bit. Upload/download on first call.

(301)862-3160 California. Baud: 3/12/24, online: 24 hrs SysOp: Buggs Bugnon. SMCIS. Using PCBoard for Southern Maryland Christian Information Service. Registration required -- access usually in 24hrs.

(301)881-6588 Rockville. Baud: 3/12/24/96, online: 24 hrs SysOp: John F. Prior. SQLBBS. For dedicated to allowing free SQL usage. 14+ tables available, 8mb of files.

Maine

(207)439-9367 Kittery Point. Baud: 3/12/24, online: 24 hrs (disk space = 200Mb) SysOp: Bill Thomas. SeaCoast Opus. Using AT-clone, Opus for IBM, HP LaserJet, DEC Rainbow, Turbo Pascal, Accounting, Database, FidoNews, PC-Gazette.

(207)967-3719 Kennebunkport. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Rick Lembree. Harbour Lights BBS. Using Commodore for SIGs and D/L for most major brands. MIDI, GEOS, CP/M, CBM, dating. Voice helpline: 207-967-3381.

Michigan

(313)263-4680 Clinton TWP. Baud: 3/12/24, online: 24 hrs (disk space = 710Mb) SysOp: Rick Wadowski. Clinton Microlink. Using IBM & RBBS for PC-SIG, IBM software, general interest Sigs.

(313)443-0365 Southfield. Baud: 3/12, online: 24 hrs (disk space = 21Mb) SysOp: Bill Rice. Cold FOG System. Sponsored by **FOG** A.M.O. 14--DEtroit FOG. Using Osborne & Metal for FOG Remote System #26. **FOG member.**

(313)538-6968 Detroit. Baud: 3/12, online: 24 hrs (disk space = 10Mb) SysOp: Bob Hermann. The PX Dock. For PX-8 files and programs only.

(313)725-4906 New Baltimore. Baud: 3/12/24, online: 24 hrs (disk space = 31Mb) SysOp: Connie Spector. Byte for Byte Info Net. For over 40 message boards, SIGs, programming, dating, ads and other services, file up/downloads.

(517)394-2447 Lansing. Baud: 3/12, online: 24 hrs SysOp: John Evans. Benchboard BBS

Bulletin Board

with Dave Parks. Using Tandy CoCo2/TCBBS for CoCo 1,2 and 3, OS-9, tech info via ASCII or XMODEM. Ideas&Beliefs sub-board. CoSysop Mark Wittkoski.

(517)496-3084 Midland. Baud: 3/12, online: 7pm to midnight SysOp: Mark Ratcliffe. Midland Area BBS. Sponsored by Midland Commodore Computer Club.

(517)793-1014 Saginaw. Baud: 3/12/24, online: 24 hrs (disk space = 230Mb) SysOp: Paul Benkert. CHARLIE with Vicky Benkert. Using PCBoard for IBM PC/C64/Atari/Apple/Amiga/Mac/Tandy/COCO-M100,etc. Multiuser,Msgs,Conferences,games,All Welcome!.

(616)342-8104 Kalamazoo. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Michael Richardson. Bathroom Wall BBS with Jason Paupore. Using Elite plus I for all computers. National souce of text files.Psychic info & clubs. Registration required. No fee.

(616)754-5536 Greenville. Baud: 3/12, online: 24 hrs SysOp: R. Christopherson. MY BBS. Using C-64 for Commodore 64, ASCII-compatible, accepting programs from any type computer.

(616)962-0400 Battle Creek. Baud: 3/12/24, online: 24 hrs SysOp: Harmon Ruble. B.C. Central. For large download files for all computers.

Missouri

(314)625-4054 Lake St. Louis. Baud: 3/12/24/96, online: 24 hrs. (disk space = 130Mb) SysOp: Richard Brown. Travel * Online. For A FREE electronic forum for the exchange of travel information with eight international coference.

(417)864-8546 Springfield. Baud: 3/12, online: 24 hrs (disk space = 15Mb) SysOp: David G. Stern. DGS = >Express. Using TRS-80 III for 5 boards online, each with 6 subsections. Open to all on first visit. Games, messages and more.

(417)865-0810 Springfield. Baud: 3/12 7E1, online: 24 hrs SysOp: Curt Finney. T1 Depot. Using Tiksof for support to T1 99/4A.

(816)229-1841 Blue Springs. Baud: 3/12/24, online: 24 hrs (disk space = 142Mb) SysOp: Gary Wood. KC- Passport. Using PCBD 12.1 for IBM and compatibles. **GKCSA member.**

(816)233-9186 ??. Baud: 3/12/24, online: 6 pm to 7 am (disk space = 30 Mb) SysOp: Mike Fuson. CMOS OPUS. Using Opus for IBM and compatibles. **GKCSA member.**

(816)257-4675 ??. Baud: 2/12/24, online: 24 hrs (disk space = 28Mb) SysOp: Kovachevch. SHOW-ME BBS. Using RBBS 15.1 for IBM and compatibles. **GKCSA member.**

(816)274-2603 ??. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: R Lovett. CITY HALL. Using Fido-11A for IBM and compatibles. **GKCSA member.**

(816)356-4199 Kansas City. Baud: 3/12, online: 24 hrs SysOp: John Boehm. Starship Discovery II with George Purcell. Using Bizarre-64 BBS for messages and games. Dedicated to the proposition of man in space. Discussion on all topics welcome.

(816)373-6447 Independence. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: D Green. IT'S ALIVE. Using BBS-PC for IBM and compatibles specializing in communications. Voice or other verifications for full access. **GKCSA member.**

(816)454-4448 Kansas City. Baud: 3/12/24, online: 24 hrs (disk space = 110Mb) SysOp: L Clouse. US-BBS #1. Using PCBS 12.1 for IBM and compatibles. Voice or other ver. for full access. Optional sub. available. 3 on lines. **GKCSA member.**

(816)459-7327 ??. Baud: 3/12/, online: 24 hrs (disk space = 20Mb) SysOp: Jim Boling. KITTY HAWK. Using PCBD 10.0 for IBM and compatibles. **GKCSA member.**

(816)468-5114 ??. Baud: 3/12, online: 24 hrs (disk space = 30Mb) SysOp: Spiegelhlr. BOARDROOM #2. Using RBBS 15.1 for IBM and compatible systems. Games. **GKCSA member.**

(816)468-5374 ??. Baud: 3/12/24, online: 24 hrs (disk space = 60 Mb) SysOp: Spiegelhlr. BOARDROOM #1. Using RBBS 15.1 for IBM and Compatible systems. General use. **GKCSA member.**

(816)471-6691 ??. Baud: 3/12/24, online: 24 hrs (disk space = 140Mb) SysOp: O Kinder. MIDWEST TYP. Using RBBS 15.1 for IBM and compatibles. **GKCSA member.**

(816)537-7675 ??. Baud: 3/12/24, online: 24 hrs (disk space = 60Mb) SysOp: D Franklin. DATA BANK. Using PCBD 12.0 for IBM and compatible. General info. **GKCSA member.**

(816)561-3650 ??. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Tom Crane. MID-COAST. Using RBBS 15.1 for IBM and compatibles. **GKCSA member.**

(816)588-1998 ??. Baud: 2/12, online: 24 hrs (disk space = 40Mb) SysOp: Doug Felts. DOC-TALK. Using TBBS 2.0 for IBM and compatibles. Medical topics and files. **GKCSA member.**

(816)734-5202 ??. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: T Raniere. C-SHOPPE. Using PCBD 12.0 for IBM and compatibles. Voice or other ver. req. for full access. Optional subscriptions are available. **GKCSA member.**

(816)833-0537 ??. Baud: 2/12, online: 24 hrs (disk space = 20Mb) SysOp: D Reimer. INDEPENDENC. Using RBBS 14.1 for IBM and compatibles. **GKCSA member.**

(816)833-3410 ??. Baud: 3/12/24/96, online: 24 hrs (disk space = 60Mb) SysOp: M Browning. A.I. BBS. Using OPUS 1.03 for IBM and compatible systems. General areas. 9600 baud is US Robotics. **GKCSA member.**

(816)931-1726 ??. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Ted Kihm. COWORKS BBS. Using RBBS 15.11 for IBM and compatible. **GKCSA member.**

(913)236-4672 Kansas City. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: D Sawyer. OTHER BBS. Using RBBS 15.1 for IBM and compatibles. Voice or other verification required for full access. **GKCSA member.**

(913)236-6530 Kansas City. Baud: 3/12/24, online: 24 hrs (disk space = 40Mb) SysOp: Bruce Heck. COMP-SPEC. Using PCBD 10.1 for IBM and compatibles. Voice or other verification required for full access. **GKCSA member.**

Mississippi

(601)373-2269 Jackson. Baud: 3/12/24, online: 24 hrs (disk space = 30Mb) SysOp: David Dent. MCS-Expansion BBS. Sponsored by **FOG** A.M.O. 58--Mississippi Computer Society. Using OPUS for MS-DOS with some CP/M, dBASE, PASCAL. Only the CHOICE software.

(601)943-6903 Bassfield. Baud: 3/12/24, online: 24 hrs (disk space = 21Mb) SysOp: Bill Hutchison. The Twilight Zone. Using IBM-XT W/PC BOARD for IBM software, MS/DOS public domain files for download all computers welcome. FREE BBS.

Montana

(406)385-2638 Westby. Baud: 3/12, online: 6pm to 11pm (disk space = 10Mb) SysOp: Mark Onstad. ONS-80 BBS. For IBM, TRS-80, Commodore support.

(406)543-8110 Missoula. Baud: 300, online: 24 hrs. SysOp: Skip Leininger. Rendezvous. Sponsored by Rattlesnake Atari Computer Enthusia. For ASCII/ATASCII.

North Carolina

(704)264-7381 Boone. Baud: 3/12/24, online: 24 hrs SysOp: Blaise Anderson. TIE-TBBS Fido 151/305. Using Tandy 1000 for for IBM downloads, echo's, CRASH mail and file requests. FidoNet nodelist searching online.

(704)541-9908 Charlotte. Baud: 3/12/24, online: 24 hrs (disk space = 65Mb) SysOp: Joseph Venturelli. 'NEW – XLR8ed Multiline.' Using TBBS 2.0M for multi-user chat.Echoconf. Computer sections. download. Small user fee.

(704)563-2646 Charlotte. Baud: 3/12, online: 24 hrs SysOp: David Campbell. The Living Water BBs. For a Christian BBs, Christian environment, games, quizzes.

(704)652-1801 Nebo. Baud: 12/24, online: 5 pm to 6 am EST (disk space = 20Mb) SysOp: Mark Tokay. . For nationwide job listings for software/hardware eng. Jobs, tips, employment opp. UPDATED DAILY.

(919)338-0236 Elizabeth City. Baud: 3/12, online: 24 hrs (disk space = 30Mb) SysOp: Gordon Cameron. Canal Bank Four B.B.S. For Apple, Atari, Commodore, MS-DOS ,CP/M, Radio Shack.

(919)383-8707 Durham. Baud: 3/12/24, online: 24 (disk space = 32Mb) SysOp: Roy Gurley. Bull City BBS with Shirley Gurley. For UL/DL for IBM/clones, C-64, C-128 and TI99/4A's.

(919)639-9932 Angier. Baud: 3/12/24, online: 24 hrs (disk space = 60Mb) SysOp: Arthur Barker. State of the Art. For online games,messages.Commodore,Atari,IBM,Holy Bible,Graphics. TDD machine may also call in.

(919)726-9737 Newport. Baud: 3/12/24, online: 24 hrs SysOp: Chuck Katsekes. The Dungeon. For IBM, Tandy, CoCo, Commodore, Atari, Amiga, TRS-80.

(919)779-6674 Raleigh. Baud: 3/12/24, online: 24 hrs (disk space = 218Mb) SysOp: Mike Stroud. Micro Message Service. Sponsored by Amiga User's Group of the Raleigh A. Using Nova's 296 10MHz for Amiga, Atari ST, MS-DOS & OS/2, Macintosh, Apple, Lap Tops, C-64/128, CoCo, & TRS-80. 5 lines.

(919)846-2157 Raleigh. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Shaun Foutch. The Grim Reaper!. Using Wildcat! for IBM, Apple, Amiga and Commodore files. Online games, color menus.

(919)934-3798 Smithfield. Baud: 3/12/24, online: 24 hrs (disk space = 50Mb) SysOp: R.H. Aycock. EASTcom BBS. Using EASTcom for ANSI graphics. Registration required for uploading and downloading. Commodore, IBM and Tandy welcome.

North Dakota

(701)293-5973 Fargo. Baud: 3/12/24, online: 24 hrs (disk space = 150Mb) SysOp: James. Grettum. RBBSPC of Fargo Inc. Sponsored by Fargo IBM PC Users Group. Using RBBS for IBM Software, Programming, Lotus, Law. Online since July 83, supports 3800 users on 4 nodes.

(701)343-2318 Larimore. Baud: 3/12, online: 24 hrs. SysOp: Edward Scherpinsky. Ski Lodge. Using Color 64 BBS for Commodore color graphics and all other 8N1 terminals. Online games.Somedownloads.

Nebraska

(402)291-6272 Omaha. Baud: 3/12, online: 24 hrs SysOp: Chuck Sohm. OMAHUG BBS. Sponsored by Omaha Heath/Zenith User Group. For Heathkit, Zenith, and IBM-compatible micros.

(402)571-1552 Omaha. Baud: 3/12, online: 24 hrs SysOp: Tom Davis. Tuxedo Amiga. Sponsored by Amiga Users of the HEARTLANDS. Using Amiga-1000 for Amiga users.

New Hampshire

(603)434-9944 Derry. Baud: 3/12/24, online: 24 hrs SysOp: Jim Webb. The Derry Info Exchg. For IBM, color graphics, message bases, file transfers, online games and netmail.

(603)669-0975 Manchester. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Donald Pomeroy. RBBS-NH. Using IBM-PC RBBS for up/download, sell/swap and PC Help conferences.

(603)881-8947 Londonderry. Baud: 3/2/24, online: 24 hrs (disk space = 20Mb) SysOp: Frank Santiago. Gallifrey BBS. Using Nochange 7.2 for Supports IBM/compatibles and Commodore. File transfers, games sections, multiple SIGs, graphics.

(603)893-2078 Salem. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Tom Theriault. Token Warrior BBs. Using Phoenix for many files to download for IBM and compatibles.

(603)898-6433 Salem. Baud: 3/12/24, online: 24 hrs SysOp: Steve Dudley. The Crash Cart BBS. For IBM, color graphics, message bases, file transfers, online games and net mail.

New Jersey

(201)247-8252 New Brunswick. Baud: 3/12/24, online: 24 hrs (disk space = 60Mb) SysOp: Fabian Gordon. EBBBS. For Atari computers, others welcome.

(201)249-4239 New Brunswick. Baud: 3/12/24/96, online: 24 hrs (disk space = 130Mb) SysOp: David A. Dworkin. Dad's Place. Using OPUS 1.03a 107/339 for quality PD software, echomail confs., Int'l network mail, local message basis, online games/BBSdata.

(201)256-0691 West Patterson. Baud: 3/12/24, online: 24 hrs SysOp: John Norman. Excalibur's Realm. Sponsored by Enjoyers in New Jersey of Amigas. Using Amiga.

(201)263-9147 Boonton. Baud: 12/24-19.2, online: 24 hrs (disk space = 270Mb) SysOp: Jim Sura. Designed Letters BBS. Using PCBoard for IBM/compats. Files compressed w/PKARC. 6 doors to DOS, online RLE Graphics, more. PCPursuitable.

(201)272-2073 Cranford. Baud: 3/12/24/96, online: 24 hrs (disk space = 60Mb) SysOp: George Porcella. The Club House. Sponsored by **FOG** A.M.O. 138--Jersey Osborne Group. Using XT clone & TBBS for US Robotics HST. **FOG member.**

(201)298-0161 Roselle. Baud: 3/12/24, online: 24 hrs. (disk space = 20Mb) SysOp: Gary Gorski. JACG BBS with Tom Shoosmith. Sponsored by Jersey Atari Computer Group. For sponsored by the Jersey Atari Computer Group. Open to anyone. Files for both 8 & 16-bit Atari.

(201)373-2125 Newark. Baud: 3/12, online: 24 hrs SysOp: Bill Rutan. Sorcerer's Palace. Using C-64 for Color Graphics/ASCII.

(201)387-7995 Dumont. Baud: 3/12, online: 24 hrs SysOp: Bill Vanglahn. County Jail II. Using Phoenix V1.00 for Interests:IBM and adult.

(201)390-9782 Old Bridge. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Dave Drust. The Hackers Hotline. Using 520ST Michtron 2.1 for mainly Atari, but IBM and Apple SIGs online. Very active message base and many files available.

(201)398-1133 Hopatcong. Baud: 3/12/24, online: 24 hrs SysOp: Marty Nichols. MICROCOSM BBS. For PD downloads. Multi message bases, conferences. Doors. IBM oriented but all welcome.

(201)403-9757 Caldwell. Baud: 12/24, online: 24 hrs (disk space = 11Mb) SysOp: Glen Johnson. Sportsboard. Using Color 64 for support of Commodore PetscII color graphics. Full support for ASCII. 8 prog lib. Games, Up/down.

(201)427-8418 New Milford. Baud: 3/12/24, online: 24 hrs SysOp: David J. Fischer. Dial-Your-Match #399. Using Zenith Z-159 for computerized dating and meeting system. This is a multi-user (2) system w/ auto switch-over.

(201)563-9057 Piscataway. Baud: 3/12/24, online: 24 hrs SysOp: Eric Lavitsky. JAUG BBS. Sponsored by Jersey Amiga Users Group. For Amiga computers.

Bulletin Board

(201)613-7350 Jersey Shore. Baud: 3/12/24, online: 24 hrs (disk space = 250Mb) SysOp: Barry Jerkowicz. Jersey Shore BBS with Lynn Harold. Using PC-Board.

(201)666-3262 Hillsdale. Baud: 3/12/24, online: 24 hrs SysOp: Neil Stewart. NJPC User Group. Sponsored by New Jersey PC Users Group. For IBMs, clones / compatibles. 8/N/1.

(201)669-8414 West Orange. Baud: 3/12/24, online: 24 hrs SysOp: Barry Wasserman. The Univrsity. Using DSoft v6.1 for 24 discussion bases ranging from AutoCAD to gardening D/L for MS-DOS only.

(201)694-8122 Wayne. Baud: 3/12/24, online: 24 hrs (disk space = 32Mb) SysOp: Jim Sadur. Sonnet Center BBS. For Compaq PC/MS-DOS,IBM, COMMODORE,AMIGA Support,37 message bases incld.HAM radio,E-mail,Politics &MORE.

(201)769-1779 Plainfield. Baud: 3/12/24MNP, online: 24 hrs SysOp: Jeffrey Morgan. Visons Infoline.

(201)798-0065 Hoboken. Baud: 3/12/24/96, online: 24 hrs (disk space = 180Mb) SysOp: Ed Mecka. Computer Connections. Using TBBS/SeaDog for national conferences for IBM, Commodore, Macintosh, CP/M, adult, cults, and more. FidoNet 107/539.

(201)828-8134 North Brunswick. Baud: 3/12, online: 24 hrs SysOp: John Dondzila. Brunswick Modem Lodge. Using EBBS for Commodore downloads, but all computers welcome.

(201)836-4310 Teaneck. Baud: 3/12, online: 24 hrs SysOp: Elliot Hecht. Riverdale BBS. Using C-64/FROG BBS for message base and public domain downloads.

(201)838-8504 Bloomingdale. Baud: 3/12/24, online: 24 hrs (disk space = 30Mb) SysOp: Thomas Thurlby. Tri-boro BBS with Robin Thurlby. Using AT&T 6300 & RBBSPC for Conferences, E-Mail, files, computer help, Up/Download, messages. Dedicated to free info exchange.

(201)868-5233 West New York. Baud: 12/24, online: 24 hrs (disk space = 120Mb) SysOp: Eran Newman. PC EXPRESS BBS. Using PC Board 12.1 for over 1500 files, farside Asylum, MIDI, Music, Sci-Fi, programming and Buy-Sell section.

(201)888-0325 Keyport. Baud: 3/12, online: 24 hrs SysOp: Robert Rinkewich. The Space Port BBS. Using C-128 for online games, Deadlock Software for the 64.

(201)906-0159 Edison. Baud: 3/12/24/96, online: 24 hrs SysOp: Steve Spear. NCC 1701-A Network. Using OPUS for IBM and compatibles. Sysop is an experienced C and Assembly programmer.

(201)942-2576 Wyckoff. Baud: 3/12/24, online: 24 hrs (disk space = 23Mb) SysOp: Peter Zuroff. FOG #49. Using Osborne & Metal. **FOG member.**

(201)984-5555 Morris Plains. Baud: 3/12/24, online: 24 hrs (disk space = 80Mb) SysOp: Robert J. Moravsik. Atrium Way with Joseph Chien. Using RBBS 15.1C for PD software exchange. Games.

(609)232-1245 Turnersville. Baud: 3/12/24/96, online: 24 hrs (disk space = 300Mb) SysOp: Phil Gordemer. Compu-Data. Using PC Board 11 for IBM & MS-DOS compatibles. Three nodes. Database Conf. Info-Mat mag aff. National PCB-Echo mail.

(609)530-0046 Lawrenceville. Baud: 3/12, online: 24 hrs (disk space = 30Mb) SysOp: Ken Miller. Phoenix RCS System. For IBM, Commodore and Apple. Validation required.

(609)693-9262 Forked River. Baud: 3/12, online: 24 hrs SysOp: Richard Niczypor. The TempeST BBS. Using AtariST Forem-ST for Atari ST and IBM computers.

(609)895-0853 Lawrenceville. Baud: 3/12, online: 24 hrs (disk space = 2Mb) SysOp: WARLOCK W. ALIEN BBS. For hardware supports U/Dloads for all computers. Comprehensive DataBase,Online Adult SPACE/FAN.

New Mexico

(505)393-3385 Hobbs. Baud: 3/12/24, online: 24 hrs SysOp: Bill Porter. Midnight Thinkings BBS. For online discount mail order. Apple, Atari, Commodore, IBM sub-boards, games, Commercial s/w, airlines.

(505)437-2280 Alamogordo. Baud: 3/12/24/96, online: 24 hrs (disk space = 32Mb) SysOp: John P. Nicholson. FAST-KODE ROS #28. Using Kaypro 10 8/N/1 for tourist Info/Local Attractions,CP/M,MS-DOS,Kaypro,Tandy,Apple,Mac,CoCo,dBase,Pascal,ROS,Amiga, &more.

(505)769-1880 Clovis. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Alfred Arnold. The Enchanted Castle with Kathleen Arnold. Using Express for all Atari support and some IBM support. Online games and Express online game makers. Msg. bases.

(505)822-8268 Alberquerque. Baud: 3/12/24, online: 10pm to 10am MST (disk space = 20Mb) SysOp: Jami Morgan. StarSeed. Using FidoNet 15/1001 for a New Age BBS, promoting New Age information. SciFi Conference, MS-DOS support. No fees.

Nevada

(702)348-0998 Reno. Baud: 3/12/24, online: 24 hrs SysOp: Mike Hammer. Investment Heaven BBS. Using RBBS (modified) for Conferences for the private investor on stocks, bonds, real estate, etc. Online games, 500 files.

(702)362-4483 Las Vegas. Baud: 3/12/24, online: 24 hrs (disk space = 400Mb) SysOp: Robert Coughlin. BULLFROG BBS. Using GST 286 for DOS, Public domain, Shareware. Fee required.

(702)386-6613 Las Vegas. Baud: 3/12/24, online: 24 hrs SysOp: Jim Poston. LVACTS. For downloads text and MSDOS. Info about Las Vegas traffic, signals, traffic counts, road destruction.

(702)454-4001 Henderson. Baud: 3/12/24/96, online: 24 hrs SysOp: Phil Baldasarro. World Wide BBS with Suzy Baldasarro. For IBM Compatibles.

(702)728-4411 Panaca. Baud: 3/12, online: 12am to 8 pm Sun SysOp: Larry Hudson. Fuller Brush Host. For current job info - FULLER.DOC. SALE.DOC describes current sale flyer.

New York

(212)489-7370 New York. Baud: 3/12/24/96, online: 24 hrs (disk space = 47Mb) SysOp: Liv Hinckley. FOG #15. Sponsored by **FOG** A.M.O. 135--New York Osborne Users' Group. Using Osborne & Metal for high speed callers - USR Courier HST modem now online. **FOG member.**

(212)598-0243 New York. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Jim DiSanti. Valhalla BBS. Using Atari130XEShowcase for E-mail (5 bases), text files, pub-dom utilities and programs. Special Atari, Commodore IBM sections.

(212)671-7050 Bronx. Baud: 3/12, online: 24 hrs SysOp: Bruce Roberts. D'BUG with 'Herbo' Rosenbaum.

(212)799-2123 New York. Baud: 3/12/24, online: 24 hrs SysOp: Stev Schlusselberg. Novus BBS with Wagner dos Santos. Using PCBoard 12.1/E3 for users from all over the world. With English, French, Norweigian - more to come. 9 conferences.

(315)369-6531 Old Forge. Baud: 3/12, online: 24 hrs SysOp: Joseph Nelson. The WAY, TRUTH, LIFE. For Spiritual and theological themes. Bible research ,question and answer. Daily one-min.-meditation.

(315)422-4078 Syracuse. Baud: 3/12, online: 9 am to 7 pm M-S SysOp: John Bigness. Prof-BBS. For specializing in commercial & small business finance brokerage. Messages,penpals. Password required.

(315)776-4698 Auburn. Baud: 3/12/24, online: 9pm to 8am SysOp: Joe Chamberlin. Escapeware. For IBM.

(315)895-7951 Ilion. Baud: 3/12, online: 24 hrs SysOp: Nick Dudish. ILION DATA SCIENCES. For C64, IBM, Apple.

(516)364-4450 Woodbury. Baud: 3/12/24, online: 24 hrs (disk space = 100Mb) SysOp: Paul Cangialosi. The Substation RBBS. Using Tandy 1000SX, RBBS for online database search of Nat'l BBSs, quality downloads, Tandy conversation, messages,PC-Pursuitable.

(516)475-6463 Patchogue. Baud: 3/12, online: 24 hrs/7days SysOp: Steve Lamberti. TI SOURCE. Sponsored by Titex. Using Atari for Support system for TI-99/4a and Myarc 9640 users.

(516)486-4705 South Hempstead. Baud: 3/12/24, online: 24 hrs SysOp: David Johnson. The Unknown RBBS. Using AT&T for AT&T PC6300 help, compatibles welcome. Home/originator: – UNIX Portal – . Tech ref, games, confs., UNIX.

(516)736-6662 Selden. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: John Woodstock. Your Software Resource. Using Atari 520ST for PC, Atari (8/16), Commodore computers. Confs. include Sysop, Amateur Radio, Games, PC, Atari, C'dore. **PRACSA member.**

(516)928-4986 Coram. Baud: 12/24, online: 24 hrs (disk space = 100Mb) SysOp: Gene DeLibero. The East Coast MidiBBs. Using Leading Edge for MIDI files/info, synthesizer patches. For Engineers, Programmers, beginners, IBM, Atari, Mac, Amiga.

(518)272-8313 Troy. Baud: 3/12, online: Mid-6pm,5p-8a Wknd SysOp: Clint Anglin. The Andromeda Galaxy. For MS-DOS exchange.E-mail. Many message bases.

(607)729-5506 Vestal. Baud: 3/12/24/96, online: 24 hrs (disk space = 82Mb) SysOp: Todd Krissel. Cygnus. Using Atari ST, Citadel for no fees, no time limits, no UL/DL ratios. Your new home of hassle-free file transfers.

(607)771-8654 Binghamton. Baud: 3/12, online: 24 hrs (disk space = 30Mb) SysOp: Harry Silva. . Using Opus 1.03b for conferences, online games.

(716)494-2520 Churchville. Baud: 3/12, online: 24 hrs SysOp: Bill Wittman,Jr. DELTA SYSTEMS with Todd Wohlers. Sponsored by. Using Tandy CoCo 2,PBBS for up/downloads. Large message bases.

(716)827-0367 Buffalo. Baud: 3/12, online: 24 hrs (disk space = 33Mb) SysOp: Allen E. Skiles. BEREA BBS. For Many popular downloads. Family oriented: Bible, Home Schooling, News of Interest.

(718)351-3859 Staten Island. Baud: 3/12, online: 24 hrs SysOp: Anneliese Sessa. Ariel BBS. Using C-64 Frog BBS for help for all computers, Daytime CHAT.

(718)380-5750 Briarwood. Baud: 3/12/24, online: 24 hrs SysOp: Jerry Salem. Seven Ray Institute. For Esoteric Astrology, Esoteric Psychology. **FOG member.**

(718)392-8836 Queens. Baud: 12/24/96, online: 24 hrs (disk space = 120Mb) SysOp: Tom Vera. Thunder Road BBS. Using IBM PCBoard 12.1 for online doors, confs, admarket, computer shop, game room, sysops, database, sprdsht, & more.

(718)417-1761 Brooklyn. Baud: 12/24/96, online: 24 hrs (disk space = 600Mb) SysOp: Peter Abrams. WPC Communications with Willie Cirino. Using PC Board 12.1 for online orderdoor. Echomail conference.

(718)482-0089 L.I.C. Baud: 3/12/24, online: 24 hrs SysOp: Greg Trobaugh. AppleCider/Comp.Corner. For Downloads for all computers, databases, o/l support, resource for handicapped, multichat line & more.

(718)531-3979 Brooklyn. Baud: 3/12/24, online: 24 hrs (disk space = 101Mb) SysOp: John Sorrentino. Wavelnghts BBS with Gene Reynolds. Using Atari 800XL.

(718)667-4470 Staten Island. Baud: 3/12/24/96, online: 24 hrs (disk space = 348Mb) SysOp: John Outhwaite. Black Box BBS. Using TBBS2 Fido 107/115 for all computers (9600 is Courier HST).

(914)343-8292 Middletown. Baud: 3/12/24, online: 24 hrs (disk space = 80Mb) SysOp: Chuck Newman. Beta Projections RBBS. Using RBBS V.15.1B for For IBM and compatibles. Online over 3.5 years.

(914)462-0363 Poughkeepsie. Baud: 3/12, online: 24 hrs SysOp: Scott Wolpert. The Outer Limit BBS with Dan Simons. For Support to IBM,Apple,Commodore and compatibles, 40Mg file section,trivia. No fee.

(914)562-7837 New Windsor. Baud: 3/12/24, online: 24 hrs SysOp: Rich Roos. The AlterLink BBS. Using IBM PC-XT,PC-Board for 8/N/1. Free registration.

(914)667-4567 Westchester. Baud: 12/24, online: 24 hrs (disk space = 360Mb) SysOp: Andy Keeves. Executive Network BBS. Using PCBoard mulit-node for callers interested in networking. Running five nodes on auto-hunt. 8/N/1.

(914)681-1769 Bedford. Baud: 3/12/24, online: 24 hrs (disk space = 117Mb) SysOp: Jay Goldstein. Kashmir BBS. Using ATclone/PC-BOARD for tax, SysOp, buy/sell and technical conferences and more.

(914)968-8511 New York. Baud: 3/12/24, online: 24 hrs (disk space = 30Mb) SysOp: Vinny Scaramuzzo. The Main Line BBS. Using QuickBBS (QBBS) for all systems. Open to the public. Up/downloading available.

Ohio

(216)241-2612 Cleveland. Baud: 3/12, online: 24 hrs SysOp: Dr. Kim Seltzer. Nation-wide with Robert Standring. For multi-user environment, employment classified ads, all users/systems welcome. U/D for ASCII only.

(216)291-2616 Cleveland. Baud: 3/12, online: 24 hrs SysOp: Lee Johnson. Northcoast Survival. Using FASTPLUS for many sub-boards, up/downloads. All computers welcome.

(216)581-1190 Cleveland. Baud: 3/12/24, online: 24 hrs (disk space = 120Mb) SysOp: Ken Seman. Cleveland Tcomm. For support of MS-DOS and CP/M. 100% free and user supported. PC-Pursuitable.

(216)671-6922 Cleveland. Baud: 3/12, online: 10pm to 6am EST SysOp: Robert Parish. Timelines...BBS with Kathy Parish. For Sinclair/Timex systems. Serving QL,Spectrum,ZX-81, TS-2068, TS-1500, TS-1000, computers.

(216)753-8791 Akron. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Ed Eaglehouse. World's End with Skip Watson. Using Amiga 1000 for All computers welcome. 18 message/game bases. Primarily Fantasy, Sci-Fi and roleplaying.

(216)755-8220 Struthers. Baud: 3/12, online: 24 hrs SysOp: Ed Luptak. Penn Ohio Users Group. Sponsored by Penn-Ohio Users Group. Using TI-99/4A TIBBS for TI-99/4A computers. 7/N/1.

(216)896-9500 Greensburg. Baud: 3/12, online: 24 hrs (disk space = 30Mb) SysOp: Nancy Abbott. Data Base BBS. Using IBM PC, Collie for all computers. Run by the Comp. Tech. students at Portage Lakes Joint Vocational School.

(419)683-3059 Crestline. Baud: 3/12, online: 9pm to 7am SysOp: Dean Norwood. Late Night Network. For New users get full access. Online games. Punter & Xmodem downloads. Color graphics for Commodore.

Bulletin Board

(419)756-0859 Mansfield. Baud: 3/12, online: 24 hrs (disk space = 2Mb) SysOp: John Sneeringer. Pulsar BBS. For conferences, 10 subboards. 5 online games. Primarily for Commodore.

(513)233-9500 Huber Heights. Baud: 3/12/24, online: 24 hrs SysOp: Smitty Smith. ACE Information Servic. Sponsored by Miami Valley Atari Comp Enthusiasts.

(513)293-1754 Dayton. Baud: 3/12/24, online: 24 hrs SysOp: Terry Morrow. DMA RBBS. Sponsored by Dayton Microcomputer Assoc, Inc. For use by current/prospective group members.

(513)444-3070 Cincinnatti. Baud: 3/2, online: 8pm to 11am SysOp: Gary Niederhelman. Wildside Electronics with Nolan Ott. For up/downloads, message bases, online ordering for all computer software and hardware.

(513)481-1417 Cincinnati. Baud: 3/12/24, online: 24 hrs SysOp: Brian Rau. COG RCP/M. Sponsored by **FOG** A.M.O. 27--Cincinnati Osborne Group.

(513)541-8473 Cincinnati. Baud: 3/12/24, online: 24 hrs (disk space = 50Mb) SysOp: William E. Smith. The Information Store. Using OPUS for online info re Cincinnatti Amateur Telecommunications Conference, August 25-28.

(513)671-2049 Cincinnati. Baud: 3/12, online: 24 hrs SysOp: Tom Altum. Omega. Using Tandy CoCo for Tandy Color Computers.

(513)787-3777 Camden. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: James Redd. The Imagination BBS. For Atari 8-bit & ST, C-64 & Amiga, IBM, Apple, CP/M and others. Uploads/downloads.

(513)879-6263 Fairborn. Baud: 3/12/24, online: 24 hrs (disk space = 22Mb) SysOp: Thomas L Ensminger. AB17 Remote System #1. Using Kaypro & PBBS for exchange of public domain CP/M programs with emphasis on communications and RCP/M programs.

(614)263-3412 Columbus. Baud: 3/12, online: 24 hrs SysOp: Irwin Hott. Spirit of #'99 TIBBS. Using TIBBS for TE II transfer, Xmodem Transfer.

(614)439-7451 Cambridge. Baud: 3/12, online: 24 hrs (disk space = 70Mb) SysOp: Vester Scott. SE OH Comp Society BBS. Sponsored by SE Ohio Computer Society. For all personal computers.

(614)622-4061 Coshocton. Baud: 3/12, online: 7pm to 6am (disk space = 40Mb) SysOp: Bruce Uher. The Utopia Network. Using CoCo 3 for SIGs for Coco, Apple, Tandy 1000, IBM Compatibles, Model 100, Model 1,2,3,4.

(614)676-7742 Bellaire. Baud: 300, online: 24 hrs SysOp: Tony Pacifico. Spaghetti Land BBS with Bob Randolph. Using C-Net 11.7 for C-64 and C-128, all computers welcome. Online games. Empire. Say you saw the ad and rec. special acc.

Oklahoma

(405)249-7143 Vance AFB. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Carol Miller. 71FTW/SC-SCTS BBS. Using Sperry PC400 for technical support, E-Mail, MS/PC-DOS up/down,shareware,freeware for OBM PC and compatibles.

(405)255-7410 Duncan. Baud: 3/12, online: 10pm to 7am SysOp: J.M. Dowlen. D.A.C.C.U. BBS. For Commodore, Atari, Amiga, PC Compatibles. Hardware support.

(405)329-6464 Oklahoma City. Baud: 3/12/24, online: 24 hrs (disk space = 70Mb) SysOp: Whitney Boutin. Constitutional Pathway. Sponsored by **FOG** A.M.O. 67--OKlahoma City Personal Computers. Using Osborne & Metal for FOG Remote System #13. **FOG member.**

(405)354-1024 Oklahoma City. Baud: 3/12/24, online: 24 hrs (disk space = 50Mb) SysOp: Bruce Yarbor. 2nd Hand Software's. Using Amiga for Amiga, C-64, C-128. Online 3 years, -always- free. Handles XMODEM, XMODEM-CRC, ASCII.

(405)357-7552 Lawton. Baud: 3/12, online: 24 hrs SysOp: David Cox. . For all computers. Automatic Verification. Downloads for Amiga, IBM,C-64, Atari.

(405)376-1494 Mustang. Baud: 300, online: 24 hrs SysOp: Thomas Mangham. CoCoNet. Sponsored by Central OK Computer Organization. For Radio Shack CoCo. Programs/mail available.

(405)631-9040 Oklahoma City. Baud: 3/12/24, online: 24 hrs SysOp: David Grothe. Amiga Line BBS. Sponsored by Oklahima Amiga Computer Enthusiasts. For THE source of Amiga information in Oklahoma.

(405)672-8270 Oklahoma City. Baud: 3/12, online: 24 hrs SysOp: Jerry Robertson. Sooner 99'ers BBS. Sponsored by Sooner 99'ers. For TI 99/4A and Geneve computers.

Oregon

(503)236-0281 Portland. Baud: 3/12, online: 24 hrs SysOp: Steve Overton. PAUG BBS. Sponsored by Portland Area Users Group. For TRS-80 and Tandy computers. All users welcome.

(503)343-3595 Eugene. Baud: 3/12, online: 24 hrs SysOp: Keith Ullman. Palantir (7). Using Fido.

(503)343-4352 Eugene. Baud: 3/12/24, online: 24 hrs SysOp: Brad Thompson. A.C.E.

(503)485-7126 Eugene. Baud: 3/12/24, online: 24 hrs SysOp: Mark Prewitt. The Challenger.

(503)687-0275 Eugene. Baud: 3/12, online: 24 hrs SysOp: Mike Schmidt. Duck Station BBS with Chris De Lay. Using Commodore 128 for Commodore 64, 128 and Amiga users.

(503)687-5198 Eugene. Baud: 3/12/24, online: 10 am to 9 pm SysOp: Edward Fitzgerald. Eugene Public Library.

(503)688-2056 Eugene. Baud: 3/12, online: 24 hrs SysOp: Bill Robbins. BillBoard.

(503)760-1473 Portland. Baud: 3/12/24, online: 24 hrs SysOp: James Deibele. TECHbooks One. Using PC-Pursuitable for more than 60 message areas. Fee for downloads.

Pennsylvania

(215)252-8867 Easton. Baud: 3/12, online: 24 hrs SysOp: Michael E. Mattes. Tekkie. Using WWIV for supporting IBM and Clones.

(215)336-8207 Philadelphia. Baud: 3/12/24, online: 24 hrs (disk space = 120Mb) SysOp: David Chernicoff. –I Have No Idea!–. Using Postmaster BBS.

(215)438-3284 Philadelphia. Baud: 3/12/24, online: 24 hrs. (disk space = 20Mb) SysOp: Harvey Bunch. FIOP BBS. Using RBBS for Copiers, stereos, printer/typewriter ribbons, business services, classified Ads and etc.

(215)464-3562 Philadelphia. Baud: 3/12/24, online: 24 hrs SysOp: Mark Miller. Satronics TBBS. For experimental Online Virtual Community. 5 lines, SIGs for MS-DOS and Macintosh. No fees.

(215)559-1941 Easton. Baud: 3/12/24, online: 24 hrs SysOp: Dawn Brader. The Limited Edition. Using Phoenix for software for IBM and Clones.

(215)623-4040 Drexel Hill. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Bob Dean. Drexel Hill Northstar. Using Advantage & HBBS for collection point for CP/M software and message exchange related to same.

(215)643-6096 Maple Glen. Baud: 12/24, online: 24 hrs (disk space = 250Mb) SysOp: John Hallden. East Coast Underdog. Using MiniNet 2A for Downloads, Sirius software support.

(215)676-0810 Philadelphia. Baud: 3/12/24, online: 24 hrs SysOp: Allan Joffe. dPlace BBS with Allan Feuer. Using RYBBS for Spreadsheets, Data Bases, DeskTop Publishing, & Communications,out of state immediate full access.

(215)678-9334 Reading. Baud: 12/24/96, online: 24 hrs (disk space = 436Mb) SysOp: Dan Bair. File Cabinet with Marj Bair. Using RBBS for multi-user system (nine lines) also supports 19.2K baud.

(215)896-9020 Ardmore. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Brian Raub. Onix. For subscriptions multi-user system (16 lines).

(412)221-4599 Bridgeville. Baud: 3/12/24, online: 24 hrs SysOp: Roger Agrawala. Saturday Night Live. Using Opus & IBM-PC for having fun. Supports several national conferences.

(412)276-1269 Pittsburgh. Baud: 3/12, online: 24 hrs SysOp: Chuck Fricaro. UCS-1. For Concurrent down/upload using the Multi-Com(tm) file transfer system.

(412)285-9911 Butler. Baud: 3/12/24, online: 24 hrs (disk space = 30Mb) SysOp: Jeff Long. Scorpion RBBS with Curt Swartzwelder. Using IBM-XT, RBBS for MS-DOS and Commodore 64/128 users.

(412)465-8601 Indiana. Baud: 3/12/24, online: 24 hrs (disk space = 30Mb) SysOp: Pat Carone. Enterprise-A BBS. For online adventures, general Sci-Fi theme.

(412)479-3786 Homer City. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Bruce Rummel. The H. C. WILDCAT!. Using Tandy 1000 SX,wcat for software for PC's and compatibles.

(412)771-5763 McKees Rocks. Baud: 3/12/24, online: 7pm to midnight (disk space = 40Mb) SysOp: Kris Celedonia. QX-tension RCP/M. Sponsored by **FOG** A.M.O. 50--Three Rivers Osborne Group. Using Epson QX-10 & QBBS for CP/M and local users groups. **FOG member.**

(412)962-9514 Transfer. Baud: 3/12/24, online: 24 hrs (disk space = 65Mb) SysOp: Bob Bross. Beacon Hill OPUS BBS. Using OPUS v1.03 for IBM, Commodore, Apple, Atari, and Amiga. Conferences for Music, Trivia, humor, Ham, and more.

(717)387-1937 Bloomsburg. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Ed Jr. Sabo. UBI BBS with Janet Dove. Using Atari ST for all computers. Online games. Large message base.

(717)429-1529 Pottsville. Baud: 3/12/24, online: 24 hrs. SysOp: D. Scott Joy. St. Clair RBBS. Using Wildcat! for all MS-DOS, many live programs online, no verification needed. Support for Tandy Models 3 & 4.

(717)561-8150 Harrisburg. Baud: 3/12/24, online: 24 hrs (disk space = 60Mb) SysOp: Eric Givler. Megaboard][. Using RBBS-PC v15.1C for 25 online games & services, over 1000 programs to download, 11 message bases.Soon:National Echomail.

(717)657-8699 Harrisburg. Baud: 3/12/24, online: 24 hrs (disk space = 75Mb) SysOp: George Peace. The Other BBS. Using Osborne & Metal for CPM+ software. **FOG member.**

(717)938-5568 York. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Craig Beible. Micro-Link][. Using PCBoard for support for all DOS systems. Online games, ASCII, GModem, Imodem, Xmodem, Ymodem, confs and more!.

Rhode Island

(401)434-4722 E. Providence. Baud: 3/12, online: ?? hours SysOp: Myron Rourke. R.I. SPORTS NETWORK. For Commodore users.

(401)943-0197 Providence. Baud: 1200, online: 24 hrs SysOp: Leo Cervone. Fantasy Motel BBS. For Commodore downloads, large message base, Free Access,A Commodore System.

South Carolina

(803)256-3546 Columbia. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Shay Walters. Para-Soft BBS. For PC/MS-DOS, CP/M and Ham Radio.

(803)393-7399 Florence. Baud: 3/12/24, online: 24 hrs (disk space = 40Mb) SysOp: Erwin J Reyer, Jr. Pee Dee Exchange-PICS. For CP/M & MS-DOS users.

(803)749-1637 Irmo. Baud: 3/12, online: 24 hrs (disk space = 1.5Mb) SysOp: Bill Fanning. The Pawn Shop. Using C-Net 12.0 for Commodore, Atari, Tandy.

(803)875-2019 Summerville. Baud: 3/12/24, online: 24 hrs (disk space = 70Mb) SysOp: Bob Simpson. The Tandy Land Board with Becky Pickel. Using PCBoard for conferences for the Model, Coco,Commodore and Atari Computers. Also sports, programmers,adult confs.

(803)894-4213 Pelion. Baud: 3/12, online: 24 hrs SysOp: Jim Collins. Health is Wealth BBS. Using Protocol:8/N/1 for real solutions to –modern– diseases and their syndromes using God's NATURAL remedies,plus warnings.

Tennessee

(615)358-3689 Clarksville. Baud: 3/12, online: 24 hrs SysOp: David Golsberry. Atari Excalibur with Wayne Loving.

(615)432-4622 Cookeville. Baud: 3/12/24, online: 24 hrs. (disk space = 62Mb) SysOp: Rich King. King's Corner BBS with Bonnie King. Using Tandy 1000sx for Supports MS-DOS and Tandy Color Computer users.

(615)476-2874 Cleveland. Baud: 3/12/24, online: 6pm to 7am SysOp: Premo Mondone. PC Solutions. Using PC-Board v10.0 for Amiga, Apple, Atari, Commodore, CoCo & MS-DOS downloads, SysOps & PCSUG conferences.

(615)573-8614 Knoxville. Baud: 3/12/24, online: 24 hrs SysOp: John Rogers. CLIP JOINT BBS. For message base, file trans. On line trivia games. New members accept call for ver. and validation.

(615)776-5438 Nashville. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Dave Matthews. The Amiga Advocate BBS with Becky Matthews. For Amiga computers, with worldwide Amiga Echomail. Immediate downloading.

(615)833-1558 Nashville. Baud: 3/12/24, online: 24 hrs (disk space = 108Mb) SysOp: Ernie Dryden. The Orphanage RCP/M. Sponsored by **FOG** A.M.O. 119--Nashville CP/M Users Group. Using Kaypro 10 & PBBS for also sponsored by North AL Osborne U G (FOG AMO #125). **FOG member.**

(615)885-4162 Nashville. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Ken Harwell. Nashville CommodoreBBS. Using Punter/XMODEM for Punternet node #79. Transfers protocols.

(615)970-2966 Alcoa. Baud: 3/12/24, online: 24 hrs SysOp: Clay Wynn. ETPCUG. Sponsored by East Tennessee PC User Group. For IBM. Fee required.

(901)360-9172 Memphis. Baud: 3/12/24/96, online: 24 hrs SysOp: Glenn Yanicek. Plane BBS. Using Atari ST.

(901)382-1864 Memphis. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Bob Earnheart. Flagship America with Ken Akin. Sponsored by **FOG** A.M.O. 15--Memphis Osborne Group. Using OPUS. **FOG member.**

(901)386-1760 Germantown. Baud: 3/12, online: 24 hrs SysOp: Pierre Lamontagne. TI-NET. Sponsored by Mid-South TI-99/4A Users Group. Using TI 99/4A.

(901)398-5090 Memphis. Baud: 3/12, online: 24 hrs SysOp: Bill Dewitt. TELEPages.

(901)763-3440 Memphis. Baud: 3/12/24, online: 24 hrs (disk space = 65Mb) SysOp: John Slavick. Memphis PCUG BBS. Sponsored by Memphis PC Users Group. For PC/MS-DOS compatible equipment.

Bulletin Board

Texas

(214)368-1129 Dallas. Baud: 3/12, online: 24 hrs SysOp: John Willsey. NUCLEAR FICTION. For reading/distribution of Sci-Fi-Hor stories and related film/book reviews. No fees.

(409)724-0646 Nederland. Baud: 3/12/24, online: 24 hrs SysOp: Dan Howell. ARRAKIS BBS with Marjorie Washburne. For public-domain software for IBM, ltd. Commodore and Atari. Doors available, 7 or 8 data bits.

(409)982-3783 Port Arthur. Baud: 3/12, online: 6pm to 10pm SysOp: Jim Easley. The Rock. For XMODEM download of public domain IBM software.

(512)366-1901 San Antonio. Baud: 3/12, online: 24 hrs SysOp: David Slatter. Masterlist. For an up-to-date list of San Antonio BBS numbers.

(512)662-9765 San Antonio. Baud: 3/12/24/96, online: 24 hrs (disk space = 120Mb) SysOp: Chuck Leazott. Network: Atari HD Exp. Sponsored by Atari Hard Disk User Group. Using Atari for largest single-line Atari-Only 8-bit BBS in the nation.

(512)836-6383 Austin. Baud: 300, online: 24 hrs SysOp: Bill Forsythe. The Billboard. Using TI-99/4A YAMS for Xmodem downloads for TI-99/4A computers. Online since 11/1/83.

(713)422-3146 ??. Baud: 12/24, online: 24 hrs (disk space = 134Mb) SysOp: Ray Cramer. The Doghouse. Using PC 12.1/D for utilities. Up/down. 9 conferences availablr.

(713)452-0346 Channelview. Baud: 3/12/24, online: 24 hrs (disk space = 40Mb) SysOp: Steve Ragsdale. The Rooftop HideAway. Sponsored by Bay Area GS User's Group. For public domain transferring, online games, 25 boards, all computer types.

(713)495-3039 Houston. Baud: 3/12/24, online: 24 hrs SysOp: Loring Chien. CPM/Houston Club BBS. Sponsored by. Using S-100 for all interested.

(713)777-2114 Houston. Baud: 3/12/24, online: 24 hrs (disk space = 3.2Mb) SysOp: Bill Pearre. OUCH RCP/M. Sponsored by **FOG** A.M.O. 76--Osborne Users Club, Houston. Using Xerox 820 & Metal. **FOG member.**

(806)355-9143 Amarillo. Baud: 3/12, online: 24 hrs. SysOp: Kip Gamache. THE SOFT ASYLUM. Using Atari ST,F.o.R.e.M for Informal discussion areas.5 message bases,online games. Real names only.

(806)794-0524 Lubbock. Baud: 3/12/24/96, online: 24 hrs SysOp: Mike Harry. Dustbowl BBS. Using RBBS-PC for all systems. Up/downloads, conferences and message bases.

(817)754-8261 Waco. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Tom Kilbride. The Waco Connection. Sponsored by Heart of Texas Modem User's Group. Using Atari ST. **HOTMUG member.**

(915)595-5499 El Paso. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Randy Blackmond. Randy's Basement. Using Phoenix for up/downloads, messages, on-line games, questionaires.

(915)672-5510 Abilene. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Bob McAtee. AG5F Ham Radio BBS. Using RBBS-PC for mail/bulletins. No games! Supports MS-DOS, TRS80 Model 100. Online 3 years.

(915)943-6401 Monahans. Baud: 3/12, online: 24 hrs SysOp: John Hautzenroeder. The BARON's Castle. Using C-Net V3 for Commodore and IBM UD & message boards. Commodore Color/graphics.

Utah

(801)423-2734 Salem. Baud: 3/12, online: 24 hrs (disk space = 40Mb) SysOp: Fred Dart. Port Commodore BBS. Sponsored by Payson Area Commodore User Group. Using C-net v11.1a for online games, active message bases, friendly users. Color/graphics for Commodore computers.

Virginia

(703)280-9072 Vienna. Baud: 3/12/24, online: 24 hrs (disk space = 115Mb) SysOp: Ed Seward. WAACE ST BBS. For Atari ST general and technical information, file up/downloads. For members of Wash area Atari groups.

(703)335-2363 Manassas. Baud: 12 to 19.2, online: 24 hrs (disk space = 260Mb) SysOp: David Arline. Corvette Driver's BBS. Using 80386 for users of the IBM/MS-DOS environment. No fees, all callers welcome.

(703)532-5568 Arlington. Baud: 12/24, online: 24 hrs (disk space = 120Mb) SysOp: Jay Falvey. Arlington S/W Exchange. For Support for Fujitsu M16, software for MS-DOS, CP/M, ZCPR. 8/N/1, online registration required.

(703)680-9695 Dale City. Baud: 3/12/24, online: 24 hrs. SysOp: Wayne Roberts. Enterprise BBS. For For Atari 8-bit, upload and download.

(804)424-0416 Virginia Beach. Baud: 3/12/24, online: 24 hrs (disk space = 40Mb) SysOp: Butch Dunn. The No*Name BBS. For Messages-based system featuring debates, Sci-Fi and sysops conferences.

(804)495-3905 Virginia Beach. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Bob Womack. STATUS Line BBS. Sponsored by Southside Tidewater Atari Technical. Using Atari 800XL/Expres for Atari 8 and 16-bit computers.

(804)590-9369 Chesterfield. Baud: 3/12/24, online: 24 hrs. (disk space = 50Mb) SysOp: Sonny Thompson. Aviator's Haven BBS. Using IBM-PC for uploads/downloads, electronic mail. 22 sub-boards. Supports all computers.

(804)977-8369 Charlottesville. Baud: 3/12/24, online: 24 hrs SysOp: John Gefaell. A Nickel's Worth. For PC public domain and shareware. Absolutely no pirates. All files ARCed. Down/Up loads welcome.

Washington

(206)236-1849 Mercer Island. Baud: 3/12/24, online: 24 hrs (disk space = 65Mb) SysOp: K.C. Coldbrook. Electric Dreams. Using IBM XT Compatible for general message exchange, IBM, Commodore, CP/M uploads & downloads.

(206)367-3837 Seattle. Baud: 3/12, online: 24 hrs (disk space = 70Mb) SysOp: Robert Dinse. Eskimo North. Using Tandy 6000/XENIX for 8 lines. Real-time conferencing,u/d, all protocols, room message systemwld-wd mail,24bd.206-365-5458.

(206)391-2339 Issaquah. Baud: 3/12/24, online: 24 hrs (disk space = 40Mb) SysOp: Stan Symms. Futzer Avenue BBS with Pat Myrto. Using PCBoard 12.1/D for PD software, Doors, and a technical as well as Programmers conference.

(206)472-9884 Tacoma. Baud: 3/12/24, online: 24 hrs SysOp: Dick Fairchild. The Total Access Board. Sponsored by Tacoma Area PC Users Group. Using 8/N/1 for messages, user group postings.

(206)491-0463 Olympia. Baud: 3/12/24, online: 24 hrs (disk space = 44Mb) SysOp: Lloyd Williams. Z-PC BBS. For MS-DOS file support. Fee for total access.

(206)523-6133 Seattle. Baud: 3/12/24, online: 24 hrs (disk space = 20Mb) SysOp: Mitch Comstock. Arcadia. Using IBM-XT for Citadel BBs prog., 150 rm., 8 hallwy., All computers supported, PC-Pursuit-able.

(206)565-0690 Tacoma. Baud: 3/12, online: 24 hrs SysOp: Paul Cutler. The Library. Sponsored by. For Commodores with color graphics. up/downloads.

(206)759-7298 Tacoma. Baud: 3/12/24, online: 24 hrs (disk space = 32Mb) SysOp: Bob Thomson. Toggle. Sponsored by **FOG** A.M.O. 72--Tacoma Open Group for microcomputer. Using Osborne & Metal for FOG members. Also sponsored by FOG A.M.O.s 99 and 112. **FOG member.**

(206)830-0312 Bremerton. Baud: 3/12/24/96, online: 24 hrs (disk space = 40Mb) SysOp: Will Schlichtman. Bremerton BBS. Using Tandy1000/Opus for programmer support, IBM compatible. Online registration required.

(206)838-1166 Bellevue. Baud: 12/24, online: 24 hrs SysOp: Rich Greene. SEA-BELL CROSSROADS with Pat Myrto. Using IBM & PC-Board for Support MS-DOS. Technical, games, utilities and messages.

(206)943-4842 Olympia. Baud: 3/12/24, online: 24 hrs (disk space = 33Mb) SysOp: Gar Nelson. Byte-It PBBS/RAS. Using PBBS/Znode #78 for CP/M and ZCPR.

(509)662-2734 Wenatchee. Baud: 3/12, online: 7pm to 9am SysOp: Selid Holt. Sid's Place with Laura Holt. Using Tandy EX 1000 RBBS.

(509)928-0578 Veradale. Baud: 3/12, online: 24 hrs (disk space = 30Mb) SysOp: Frank Sousa. DollarMaker. For entrepeneur & money making ideas exchange. Up/downloading.

Wisconsin

(414)279-6027 Pell Lake. Baud: 3/12, online: 10pm to 2am SysOp: Mark Holden. The Bent Keyboard with Rick Weshenfelder. Using ROS board for Rotating library of files by request. Chat. Full files list in LOGIN area. Sysops will chat 10pm-2a.

(414)543-8929 Milwaukee. Baud: 3/12/24, online: 24 hrs SysOp: Thomas Atkinson. HOME-PC. For IBM general, IBM-PC,host RBBS-PC, FREE-NO REGISTRATION PERIOD.

(414)634-5776 Racino. Baud: 3/12/24, online: 24 hrs (disk space = 110Mb) SysOp: Dennis M. Thomas. PC ACCESS BBS. Using PC Board for MSDOS support, Tandy color computers.

(414)654-9158 Kenosha. Baud: 3/12, online: 24 hrs SysOp: Jim Ross. Electric Dreams BBS. Using C-64 for Supports C-64 and other systems.

(414)964-5160 Milwaukee. Baud: 3/12/24, online: 24 hrs (disk space = 1200M) SysOp: Bob Mahoney. Exec-PC BBS. For 48 lines, 50,000 + files, conferencing, etc. Ltd. free access, $45/yr full access. Direct PCP access.

(414)989-2536 Forest Junction. Baud: 3/12, online: 24 hrs. SysOp: Jeff Mohr. The Unicorn BBS. For Supporting all 8-bit and some 16-bit computers. THE home of COMPADNET, the new computer ad service.

(608)244-7045 Madison. Baud: 3/12, online: 24 hrs SysOp: Don Lampman. ICEWEB. For Cable TV/Electrical Info. Int'l Cable TV & Elec. Workers Exchg. Board. Free access, open to public.

(608)655-3806 Madison. Baud: 3/12/24, online: 24 hrs (disk space = 40Mb) SysOp: Fran Selje. Madison Tandy Users. Using Tandy 1000 for Support of CoCo, Tandy 1000, Models 1-3-Max, 100/200, and hams. 8/N/1.

(715)386-2364 Hudson. Baud: 3/12/24, online: 24 hrs SysOp: Jarrod Karau. Pirate's Cove. For anyone who calls.

(715)833-1322 Eau Claire. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Jeff Sorte. MomentaryLapseOfReason. Using Apple for all computers and most topics. UL/DL, games and much more!.

(715)836-2146 Eau Claire. Baud: 1200, online: 10pm to 8am (disk space = 20Mb) SysOp: Jim DeVries. Underground Connection. Using IBM-PC for all computers. Many conferences, with lots of IBm public domain software.

West Virginia

(304)525-2031 Huntington. Baud: 3/12, online: 24 hrs SysOp: Larry Brammer. HUG Users Group. Sponsored by Personal Computer -- Huntington U G. For Mostly MS-DOS. Includes messages and public-domain software.

(304)797-8671 Weirton. Baud: 3/12/24, online: 24 hrs (disk space = 22Mb) SysOp: Bill Davis. Ovac System BBS. Sponsored by Ohio Valley Association of Computer. For Supports all computers.

(304)877-5157 Mt. Hope. Baud: 3/12, online: 24 hrs SysOp: Robert Painter. Challenger with Jeff Richmond. Using RBBS-PC for IBM, Apple, Atari, Amiga, Commodore and TRS-80 files.

Wyoming

(307)527-7812 Cody. Baud: 3/12, online: 7pm to 7am SysOp: Paul Card. Big Horn Basin U.G. with Rand Flory. Sponsored by Big Horn Basin Computer User's Grp. Using FIDO for file areas include Search & Rescue, Extension Service, IBM, Atari, Apple and many others.

Canada

British Columbia

(604)271-5934 Richmond. Baud: 3/12, online: 24 hrs (disk space = 20Mb) SysOp: Jay Siegel. Vancouver Foglight. Sponsored by **FOG** A.M.O. 17--Vancouver Portable Computer Club. Using Kaypro PC & Opus for CP/M and MS-DOS. **FOG member.**

Manitoba

(204)831-5856 Winnipeg. Baud: 3/12, online: 24 hrs (disk space = 22Mb) SysOp: Steve Histed. Muddy Water User Group. Sponsored by Muddy Waters User Group. For Serious CP/M and MS/DOS support, Group's message base here.

Newfoundland

(709)489-2653 Grand Falls. Baud: 3/12, online: 24 hrs SysOp: Steve Bragg. The Newfie Bullet,BBS. Using PC Board 12.1/D.

(709)489-4758 Grand Falls. Baud: 3/12/24, online: 24 hrs. (disk space = 20Mb) SysOp: William Hiltz. THE NCS BBS. Using PCBOARD 12.1/E for IBM Compat, confs, auth. PC-SIG dealers, doors, Zmodem, Sealink. Use GUEST USER & OMEGA for access.

Ontario

(416)691-8245 Toronto. Baud: 3/12, online: 12 noon to 11pm SysOp: Ernie Horrocks. SUIT- BBS. Sponsored by Sanyo Users in Toronto.

(613)952-2289 Ottawa. Baud: 3/12/24, online: 24 hrs SysOp: Ian Cottrell. Information Centre. For compiling RCPMmmyy.LZT (list of operating Remote Systems).

(705)746-9115 Parry Sound. Baud: 3/12, online: 24 hrs SysOp: Bob Cooke. Bob's Bored BBS. Using C-64 for ALL systems welcome! Features bulletins, message bases and up/download areas.

Quebec

(514)324-9031 Montreal. Baud: 3/12/24, online: 24 hrs SysOp: Christian Poirier. ZAP. For support of MS-DOS and CP/M.

(514)587-5087 Contrecoeur. Baud: 3/12, online: 24 hrs SysOp: Tony Dallaire. CBBS-Microtron Enr. For promoting French language and public domain software.

(514)684-4922 Roxboro. Baud: 3/12/24, online: 24 hrs (disk space = 102Mb) SysOp: Rene Champagne. Ozzie's FIDO (FOG #47). Using Osborne & Fido for support of CP/M. **FOG member.**

(514)695-0778 Pointe Claire. Baud: 3/12/24, online: 24 hrs (disk space = 120Mb) SysOp: Jim Varey. Cameo Communications. Using PClone/Wildcat1.10 for IBM. $10/year to download. – Trade Wars – online game.

Saskatchewan

(306)347-1015 Regina. Baud: 3/12/24, online: 24 hrs (disk space = 47Mb) SysOp: Cris Ball. Onyx RCP/M with Roland Stoneham. Using Osborne & Metal for FOG Remote System #50. **FOG member.**

Thailand

252-4300 Bangkok, Thailand. Baud: 3/12, online: 24 hrs SysOp: Niko Viravatanadej. BUG BBS. Sponsored by Bangkok Computer Users Group. Using Opus for all computers and operating systems.

Networking

by Michael A. Banks

A Monthly Roundup Of What's New Online

DELPHI
New Business Offerings

You'll find two new listings on DELPHI's Business & Finance menu: CD Infoline and Mutual Funds Rates.

CD Infoline presents a daily update of the 20 U.S. banks with the highest "jumbo CD" interest rates. There is a surcharge of $1.75 per report. Mutual Funds Rates provides quotes for some 1700 mutual funds. A surcharge of 7 cents per quote is levied. Type BUSINESS at the DELPHI Main Menu for access to these services.

Alternative News Source

DELPHI's NEWS-WEATHER-SPORTS menu offers an interesting new feature—is Views On News. Hosted by Ellen Kaufman, Manager of the Micro Artists SIG, it features contributions by several DELPHI personalities. Primarily a forum for discussing current events, Views On News also offers columns such as Bob Fried's "Articles of Lasting Strangeness" (and they are). Type NEWS VIEWS to sample Views On News.

Focus on C*SIX
New Database Topics

The C*SIX database area has been completely revamped, with several important new topics combined with the best of the original topics. The new database topic lineup looks like this:

```
Databases Available Menu:
General Information          Telecomm
Reader Response              Peripheral
New Technology               CAD/Grapl
Desktop Publishing           Books
Local-Area Networking        History
Operating Systems            Digressior
Programming
```

As you can see, we're reshaping C*SIX to accommodate your interests. For descriptions of each of the topics, type TOPIC at the C*SIX Main Menu.

Polls

After you've had a chance to look over the new topics, we'd like your feedback—on the new elements of the SIG, as well as on other topics. You can provide feedback to the SIG manager via E-mail to TEDRUDE, or through polls in the SIG's Poll area.

And if you're interested in voicing your opinion in public, or seeing what others have to say, you'll want to check out the Polls area in the C*SIX SIG. This is where you can survey opinions on the computer industry, products, and services, as well as on less weighty matters. You can express your opinion by voting in a poll and adding comments, scan poll results, and even create your own polls.

To enter the Poll area, type POLL at the C*SIX Main Menu.

This menu will be displayed:

```
POLL Menu:
BROWSE through poll results        HELP
CREATE a new poll                  LIST poll
EDIT your poll comment             RESULTS
EXIT                               VOTE on

POLL>(BROWSE,CREATE,EDIT,LIST,RESULTS,VOTE
```

The commands are pretty much self-explanatory, but here's a quick-reference guide to using them.

BROWSE is used to view the current voting results of any or all polls. Type BROWSE alone to see the results of all polls in sequence. Each poll's results will be displayed, followed by a prompt asking if you want to vote on the current poll, read the current poll's comments, or skip to the next poll. (This feature is a convenient alternate to using VOTE, if you wish to vote on every poll.)

Networking

IF you type BROWSE followed by the first few letters of the name of a poll you wish to peruse, you'll see the results of that poll only. (To see the names of the available polls, type ? after you type BROWSE.) The option to read, vote, or skip will be presented after the poll's voting results are displayed.

CREATE lets you create a poll to sample the opinions of your fellow C*SIX members. After selecting CREATE, type a descriptive name for your poll (up to 60 characters in length) and select a poll format from among the three available (YES-NO, Degree of agreement or disagreement, or Multiple choice). Next, enter a few lines of text to describe and present your issue to the voters, enter CTRL-Z, and your poll will be posted.

Use EDIT to amend or add to your comments after you have voted on a poll. You'll be prompted to enter the text that will replace your current comments. Enter CTRL-Z when you're finished, or CTRL-C to abort and leave your comment unchanged.

LIST lists the names of all the polls available.

Use RESULTS this command if you wish to see the complete results of a specific poll, including all comments. Type RESULTS followed by the name of a poll to see the results of that poll. (If you type RESULTS alone, you will be prompted for the name of a poll.)

To vote on a specific poll, type VOTE. Voting is easy—just follow the online prompts. You will be prompted for the poll name, after which DELPHI will display the text presenting the issue and prompt you for your vote and comments (up to four 80-character lines).

Polls show votes by number and percentage, and users may add voting choices to some polls. A typical poll (with results) looks like this:

1. TAX ON PUBLIC ACCESS, created by CSHOPPER.
Creation date: JUL 22,1987

The FCC should not be allowed to surcharge on line charges

CHOICE	VOTES	PERCENT
STRONGLY AGREE	68	85%
AGREE	7	8%
UNCERTAIN	0	0%
DISAGREE	0	0%
STRONGLY DISAGREE	5	6%
TOTAL VOTE:	80	

Type "VOTE" to vote, "READ" to read comments, <return> for next poll:

Weekly Conferences for Sinclair Users

C*SIX now hosts a Sinclair users' conference, moderated by Mark L. Fendrick, every Sunday night. The conference begins at 9:30 PM EST.

BIX
E-mail Enhancements

BIX's E-mail system is sporting several enhancements, among them an absolute/relative message numbering system that allows BIX users to more easily read, reply to, and otherwise manipulate messages, individually and in groups. There's also a new command, "unread," that displays only new messages, rather than all messages stored online. The entire system is more efficient and easier to use.

New BIX Conferences

BIX continues to add special interest conference topics. The latest additions are "libraries," "dogs," and "Switzerland."

The "libraries" conference is for library users and professionals. Its stated intent is to enable you to "find out what the future holds for your local library, how it's dealing with current problems, and how it will function as computers and other technologies expand its role."

BIX's "dogs" conference is for dog owners and lovers, and open to anyone, regardless of breed.

The "Switzerland" topic is especially interesting because it not only covers topics related to Switzerland (such as the Swiss nuclear power plant policy), but it also presents topics in German and French! Other topics accommodate personal introductions, and provide in-

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Bulletin Boards R'Us
continued from page 408

be found on many boards as FILL20.ARC (41K), also on BXR.

With the command "FILL *.* A:" the program will commence to copy all your files, filling up each floppy disk. To do this, FILL will build a list of the files of the directory, sort this list by size order and then copy the biggest file to the floppy. Second, it will copy the biggest file that can be copied in the remaining space of the floppy and so on.

When it calculates that the first floppy will be filled up, the program will prompt you for another disk until the directory is completely copied to floppies. In this way, the program optimizes floppy disk space, makes the job easy and keeps your files in their original-executable format.

FILL will allow you to list files, delete or format the destination floppy without leaving the program. You will never have to stop because you do not have enough formatted floppies. You can also change, make, remove directories or label the target floppy.

The only restriction is that the biggest file of your directory must fit on one floppy (362,496 bytes or 1.2 meg according to your configuration). If the biggest file does not fit on a floppy you will have to use the backup/restore solution or use a "slicing" program to break your big files into smaller parts. Lalonde provides another utility, CUT.ARC, which will help when this procedure is necessary.

When you call FILL with appropriate parameters, it first builds its list of files to copy. If you select the "/F" option, the utility will ask for confirmation before each file. When the list is compiled, the main menu appears. If a file exists on the target disk, you have the choice to rename the existing file, overwrite it or skip the source file.

Normally, FILL copies only files from the current directory (or the specified directory). But it can also copy files from sub-directories. The option "/S" allows you to repeat the process on every sub-directory under the

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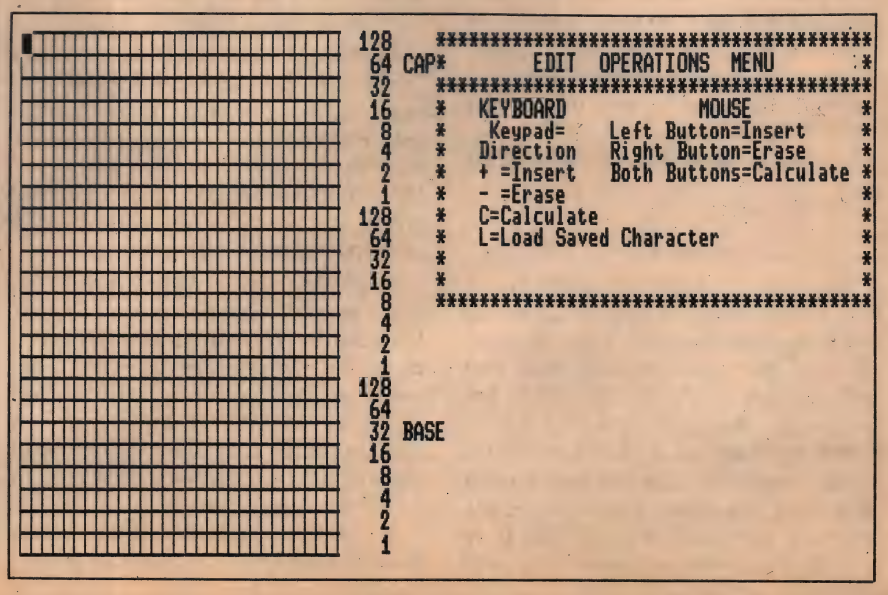

Networking continued from page 417

formation on Swiss politics, regions, restaurants, shopping, local computer user groups, and more. Worth checking out.

CompuServe
Online Today Establishes A Readers' Forum

CompuServe's *Online Today*, the electronic and hard copy magazine for CompuServe subscribers, has established a Forum (aka special interest group). The forum enables subscribers to make contact with *Online Today* writers, as well as to find help with problems online. A special sub-topic provides a venue for questions and comments to authors Charles Bowen and David Peyton about their books, *How to Get the Most Out of CompuServe* and *Advanced CompuServe for IBM PC Power Users*. Type GO OLTFORUM to access the new forum.

Dow Jones News/Retrieval Service
Capital Markets and Financial Futures Report Added

Dow Jones News/Retrieval's newest database is the Capital Markets & Financial Futures Report (access with the selection command //CMR). The new database, which concentrates on money and financial futures markets, as well as international credit markets and the Federal Reserve board, is updated daily between 7 a.m. and 7 p.m., EST.

GEnie
GEnie Adds Computer Connection RoundTable, Revamps Writers' RT

GEnie continues to add new RoundTables to its roster of online special interest groups. The latest is The Computer Connection RoundTable. This RT is sponsored by *The Computer Connection*, a weekly, nationally-syndicated radio magazine. In addition to carrying items of interest from *The Computer Connection*, the RT also hosts *PowerSystems Journal* (concentrating on IRIS, Unix BITS, BLIS/COBOL, SLICE, and other mini-mainframe computer operating systems), *Computer Living/NY* (a magazine for the tri-state New York computer community), and *HyperAge Magazine* (for Hypertext and HyperCard users).

In the meantime, GEnie's Writers' RT is undergoing some important improvements. Among the scheduled additions are more software for writers, an innovative searchable market database, sample contracts, articles about writing, and information about the law and taxes. Surveys, discounts on books and magazines for writers, and regular conferences are also on the blueprints. (Many of these additions are already in effect.)

The Source
Free Password Changes

Always big on encouraging its users to change their password frequently, The Source now suspends billing charges while you are changing your password. To change your password, type CPW at the main prompt.

SYSLINK
A Different Kind of BBS

If you're in or near Chicago, you'll want to check out Chicago SYSLINK, a marketing—and special interest group—oriented BBS which serves as the flagship of network of allied systems located in the U.S. and Canada. (14 more SYSLINKs are currently under development.) Ditto for other SYSLINK cities, which include Providence, Rhode Island, Fort Myers, Florida, and Sault St. Marie, Ontario, among other locations.

Each SYSLINK location uses the same software and offers marketing areas, online newsletters/newspapers, SIGs, bulletin boards, and much more. Of special interest is the fact that SYSLINK users can exchange E-mail with users on SYSLINKs in remote cities—at extremely reasonable rates. (Users may, of course, dial up a SYSLINK in a city other than their home system.)

Each SYSLINK functions more or less as a community BBS for its region, above and beyond the online marketing and inter-system links.

Several SYSLINKs specialize in their offerings. For example, the Fort Myers SYSLINK leans heavily toward scuba diving, while the Providence SYSLINK specializes in astrology and other New Age topics.

For information about the SYSLINK nearest you, call (312) 622-4442 (modem).

UNISON
"Urgent" Delivery Option Available For DASnet Messages

For $1.00 extra, you can now have E-mail messages destined for other systems via UNISON's Universal Mail System (using DASnet) asap—usually within one hour of posting.

New Non-Profit Marketing Group Formed

UNISON has added two specialists to its marketing department to handle the telecommunications needs of non-profit, education, and church groups. UNISON accommodates several such groups already, via private networks.

"Computing Across America" Now Available

Steve Roberts, well-known for his high-tech bicycle odysseys across the length and breadth of America, has put together a chronicle of 10,000 miles' worth of his adventures in book form. Titled *Computing Across America*, the book was recently published by Learned Information (143 Old Marlton Pike, Medford, NJ 08055. $9.95 for the trade paperback, $15.95 for the hardcover.) ●

Bulletin Boards R'Us continued from page 417

specified directory without repeating the command line.

FILL may present a compatibility problem with some caching programs. It is recommended that the utility be invoked with a batch command that will disable caching for the target floppies. One can set permanent parameters using the environment and the DOS command SET. When loaded, FILL checks in the environment for the variable "FILLSPEC." The SET command could be included in the AUTOEXEC.BAT file. A PIF file is included for loading the utility into the MicroSoft Windows environment.

The author has placed the utility in public domain. He says: "You can use or redistribute this program freely as long as it is done at no cost (except floppy's cost), if this documentation file and the copyright remain intact. Feel free to send me some money if you like FILL." Modula-2 sources of this program and JLModules are available for $25.

Super Print

Does the world need another printing utility? Only if somebody comes up with some thoughtful new features. With all the intelligence around, that gets harder to do all the time. But Steven E. Margison brings us an interesting shareware product which, while it repeats functions found in other software, manages to combine many features into an efficient and tight package, compiled in Turbo-C for speed and size improvements.

SUPERPRINT may be used to send output to another device or to a file, and can override direct BIOS access. It will format and print text files or programming code with 61 lines per page, truncating all lines to 80 columns. An extensive set options allow other features, such as: line numbering, heading at top of page with page numbers, file date and (optional) time at top of page, pause between pages for single sheet printing.

Other important capabilities include: "raw" mode to override automatic page ejects and formatting, ASCII mode to strip all high bits and illegal control codes, slashed zeros, margin setting, all kinds of page numbering sequences, number of copies to print, automatic PATH search for configuration and translation files with ability to override search, user prompting for multiple files, and much more.

Command lines may be entered in UNIX or DOS style; i.e., all options are preceded by a hyphen (-) or slash (/) (except $) and any number of options may be combined following a hyphen. More than one option argument can be given, and the input filenames may be interspersed with the options.

Beginning with version 2.5, the program uses BIOS print services to LPT1 by default. This provides high speed operation suitable for use with high speed printers, printers with built-in buffers, external print buffers, or disk spooling software. The assignment of printer may be changed to LPT2 or LPT3 on the command line.

By specifying a configuration file on the command line, it is possible to send control strings to the output before and/or after printing, to set default options, and to set a default output device other than LPT1. The configuration file is an ASCII text file, which may be created with any editor, or the "non-document mode" of word processors. Each line of the file configures a specific feature of SUPER PRINT.

The package can be found on many boards, including BXR, as P270.ARC (packed 58K, unpacked 102K). It can be acquired directly from Steve (124 Sixth Street, Downers Grove, IL 60515; registration is $10). Source code is also available: Turbo-C Small Model, 10; Turbo-C Five Model and Source, $25. (Source code is not Shareware and is not to be transferred to other users. Only the Small Model Libraries, header files, utilities, and documents are released into shareware.)

Healthy dBase Files

Here is a freeware datafile checker, provided by Comtech Publishing Ltd. It will check the general integrity of DBF datafiles. It is particularly useful to alert you to the presence of file damage prior to making backups. It is called DCHECK and can be found on many boards under the name DCHECK.ARC (17K arced, and 26K unarced).

DCHECK may be run at the DOS prompt or in a batch file and may be used to check a file or a group of files. For example, to check the file CLIENTS.DBF for damage, enter the command: DCHECK CLIENTS.-DBF. To check all the DBF files in the current directory, enter the command: DCHECK *.DBF.

If you have many DBF files in the current directory, DCHECK's output report may scroll off the screen. To avoid this, you may redirect the report to a file which you can read at your leisure. To redirect the report to a file called RESULTS, enter the command: DCHECK *.DBF > RESULTS. The company publishes the program DSALVAGE, which enables users to rebuild, from a simple menu-driven screen, damaged dBase files and backups.

Stop & Shop For Shareware

One stop online shopping for shareware? I guess this was inevitable. If after using a shareware product, you desire to register your copy, here is a new twist, an online shareware registration board! You no longer have to send a check through the mails. There is now a direct online purchase convenience which will take plastic money. "VISA and MasterCard gladly accepted!"

The BBS is conducted by our good friend and master programmer John Newlin, creator, among other things, of ARCMASTER, a menu-driven utility for every kind of archiving function. The new board's number is 619/455-5226 (24 hrs 7 days), 300-1200-2400 baud, No parity, 8 bits, 1 stop bit (N81). In addition, Newlin (CEO of New-ware Software), will try to keep the board well-stocked with the latest in shareware. He can also be reached at John J. Newlin, 4060-228 Rosenda Ct., San Diego, CA 92122.

There is no membership fee and downloaders are welcome! In addition, users can register any shareware product through this board, using a credit card. Are we seeing the wave of the future for software marketing? ●

Godspell Is Online

by Hal Nieburg

Bulletin boards are burgeoning across the wired landscape, specializing their audiences and proliferating their numbers. Recently, we ran a list of boards devoted to law and medicine. This article spreads the word that religiously-oriented boards are poking through into the sunshine, like the first shoots of daffodils poking tender heads through the Spring loams. They hold particular interest to online buffs of whatever persuasion, with interesting and different software, people, forums, messages, and services.

The "Christian" networks I have persued so far tend toward the fundamentalist point-of-view, but are well worth a browse. They provide such services as religious and psychological counseling and/or referrals, news and phone numbers of welfare agencies, prayer marathons, religious events and services, vigorous theological discussions and texts, extensive verbatim Bible extracts and whole books in ASCII ready for the downloading, which can be arrayed in various ways, computerized cross-referenced concordances, databases, search software, parables and stories with moral themes, adult and childrens' trivia-type and inventive arcade games—and so on. There can be found, and I think no place else, major interactive tutorials for learning Hebrew and Greek.

There is also excellent general BBS stuff like that found on secular boards. Best of all, the housekeeping of these boards is consistently conscientious and excellent, and the Sysops pervade the atmosphere with a sense of welcome and warmth which will make the guest feel very much at home in seconds. Unfailing courtesy and kindness are the norms, and, after butting heads with some of the vulgarities and harsh manners of so many secular boards, this can be an endearing relief.

On these boards, there is always room at the Inn and a place at the table, for any visitors, and no questions are asked—one gets the sense that even Jean Valjean could steal the silverware and be forgiven here.

In one testimonial, a Sysop reveals his inspiration: "Why a Christian BBS? Well, around the beginning of 1983, after a long struggle against it," he was awakened by a new religious commitment. "Not too long after that I got the Computer bug and discovered the joys of BBSing." Somehow, it all seemed a bit empty to me, these BBSs, because most of the people I saw on the boards were playing these little ragging games and talking a lot of trash and generally wasting my time every time I wandered into the message areas."

Then he decided to run BBS on his own and make it a model! "What would a Christian BBS be?" I asked myself. "What makes it 'Christian' anyway?" How to do that without imposing, harassing, or accusing anyone has been the biggest challenge. "Is Evangelism the only reason I went to all this trouble? No. I am interested in computing too!"

A list of "religiously oriented" bulletin boards is given in Figure 1. Initially prepared by Wisdom Research, the list can be freely reproduced and distributed. For more information, contact Informed Christian Network DATA LINE: 214-271-2487 4pm-10am M-F CST, 24 hours Sat-Sun, PROTOCOL: 300/1200/8/N/1.

Figure 1 on page 420

Inventive NiteWing

Typical is a local board in my neighborhood, called NiteWing (PO Box 509, Owego, NY 13827, Thomas McElveen-Sysop, 706/687-3470, 1200-8-N-1) which is a model of its kind. In its policy statement, NiteWing proclaims that "this board was built to provide computer users with access to vital information about Jesus and the Bible that perhaps they'd not otherwise discover. This does not mean that we are here to preach at you! It means that information is here, if you wish to find it."

Most of the board resembles others, with some great file areas and several message areas too! If you wish to discuss "religious" things, there is a message area just for that. The board is open to all. "If the subject matter offends you, perhaps you shouldn't apply—but we welcome you, anyway!"

Like other boards, attempt is made to enforce rules of civility and comity. "Profanity will absolutely not be tolerated. Anywhere. Period. No copyrighted software, please!! No ragging! This board is here to promote good will, not to slander anyone. You will get one warning. Be friendly, OK? And enjoy yourself."

There is, of course, some proselytizing, as illustrated by this recent exhortation: Dr. Bert Pepper (no relation to the soft drink), a New York psychiatrist, said, "each of us has our favorite object of constancy. Many Americans have picked Classic Coke. It's up to us to spread the word, so many more will pick Jesus. NiteWing hopes that your security will be in Jesus Christ!"

The evangelical thrust is generally low key and one can sidestep these messages and go the parts of the menu of interest. If conversions are sought, they will probably be made by the example of good will and openness, not by hard sell. And most of these Sysops seem to understand that point very well.

NiteWing shows great resourcefulness in providing interesting activities and original services for all Sysops for all audiences. Look at some of the inventive conferences which are carried, as shown in Figure 2 on page 420, including bicycling, gourmet cooking, politics, Star-Trekies, and sports.

He offers interstate communications at nominal cost. For those interested in sending mail long-distance, just leave a message to the Sysop and he will work out arrangements. In general, the cost is 25 cents per message within the state

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" One of the most important parts was left out of your clone" --J.T.

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* MS-DOS 3.21 with GW-Basic.....$75.00

Using PC-DOS.....$22.95
This book cover's every aspect of the IBM operating system. Up-To-Date Information on IBM'a PS/2 computer's. Cover's version's up to 3.3. (800 pg.s)

Managing your Hard Disk.....$19.95
Easy-To-Follow instruction teaches you how to get the maximum performance from your hard disk. (557 pg.s)

The PC Configuration Handbook.....$19.95
This is a complete manual to System Expansion, Routine diagnostics , and basic maintenance, this book will save you time and money! (431 pg.s)

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Godspell Is Online
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and up to 45 cents for other places in the US. To introduce users to the long distance service (the Matrix), NiteWing offers a credit account to any interested user to send 5 messages to the clearing house Opus Pocus BBS. There will be a ten-cent deduction from this credit for each message sent via the Matrix Area. (50 cents initially).

To send a message to Opus Pocus you will need to supply the "NET/NODE" address. For Opus Pocus, it is 260/415. You can enter just "415" and it will work. Matrix is the Network of Opus, Fido and Seadog type bulletin boards that communicate regularly via a "controlled" assignment of unique system addresses. A single system (such as NiteWing) is called a "node." Several nodes linked together via a system which services those systems is called a Net or sometimes a Region.

Nets usually exist in highly populated areas, whereas a Region covers the rural areas in a section of the country. To send a message from one Node to another requires a phone call by the originating system to the receiving system. This is why it costs a little money each time a message is to be sent. In order to send any long distance messages, you must have an "account" set up with your local Node. For messages to nodes in the continental US, the charge is 20 cents per message. Mail to Hawaii and Alaska run 50 cents per message.

The price is calculated on the rate for a one minute call, as this is the minimum charge the telephone company uses to bill the system's phone line. Handling the balance of your "account" is done automatically by Opus each time you enter a message involving a charge. To view your account balance, use the S)tatistics selection from the main menu.

In order to educate the users in the use of this feature of the board, Sysop McElveen offers a credit of 80 cents to any user to send 4 messages to any system in the Continental US at no real charge. There is also an echomail conference on the board! This is the National Bible Conference. It is a consortium based on the Holy Scriptures and the interpretation thereof. Another new echomail conference—Opinion. Controversial issues are especially requested.

To stimulate an activity on his board, McElveen launched a contest to award the best ANSI artists some nice prizes in return for their work on an ANSI Christmas "greeting card." There is also a conference "For Women Only!" to bring more females into the net "without the distraction or intrusion of us males with all our computer talk. This message area is hidden and restricted against male registrants.

Summoning Prayer-Power

There is a CompuServe-like system, Christ Net, a "National Network Conference Message Base," designed to link all the nodes of this particular system together. It is coordinated and founded by B.L. Shackleford Jr. of Cincinnati, Ohio, with the purpose to "Glorify Jesus Christ through word and prayer over a computer network; Study with openness and understanding the Word of God, the Bible; Share Christian experience with others of like faith and doctrine; encourage one another in a Fruitful Christian Spirit of Love; witness Christ's Word through the Holy Spirit to a lost and blind world; and establish a Christian link through a National Prayer Request Network."

To join this network, an aspiring Sysop must operate a System dedicated primarily for the furtherance of the Gospel and must advertise that fact publicly upon entry to his/her phone line. They must undertake to send the national coordinator an updated list of any additions in the net to be added to a routing diagram, for any of the purposes noted and also for transmission of E-Mail.

The fact that public bulletin boards proliferate and specialize testifies to the vigor of this new community of discourse. It is becoming a realtime fact of life and a rapid means of exchanging information and services. Computer networking becomes, like the streets of a crowded neighborhood, the focus of all kinds of activity, from the common to the marginal.

The Online community becomes McLuhan's "global village," offering a psychic stage, forum, and market. Just as hucksters, preachers, jugglers, and clowns ply their callings on the streets of the city, so we see the wired village become a series of small neighborhoods, each a universe in its own right, a place which can command our mental horizons, that is full of mental stimulation, both spiritual and material, sometimes enchanting and edifying, sometimes otherwise.

It therefore seems appropriate that along the party lines that connect thousands of computers, there should be quiet nooks for contemplation and prayer, like little wayside chapels along the highways of an increasingly wired and tumultuous nation. ●

AK	907-345-6661	Alaskan Christian Exchange, Anchorage
AR	501-864-0699 C	Computers For Christ, #7 El Dorado
CA	714-983-9923	Computers For Christ
CA	714-974-4294	Prayer In Home
CA	707-964-7114 A	Commodore Christian, Fort Bragg
CA	707-542-7819 D	Church News Videotex/Audiotex Service, Windsor
CA	408-253-6523	Message To Jehovah's Witnesses
CA	408-732-0312	Christian
CA	408-997-2790 C	Computers For Christ, HQ , San Jose
CA	408-262-1003 A	City Gates West, San Jose
CA	415-341-2962 C	Computers For Christ, #2 San Mateo
CA	415-562-5483	Family Forum, Oakland
CA	415-341-2962	Computers For Christ, San Francisco area
CA	805-687-2754 B	Father John's Place (Catholic), Santa Barbara
CO	303-426-4052	Christian Protocol, Denver
FL	904-625-2737 A	The Light, Silver Springs
FL	904-385-2763	Eagle's Nest
GA	404-921-8108 N	Atlanta Christian Conference
IA	515-576-0591 A	FISHNET, Fort Dodge
IL	312-362-7875 A	Computers For Christ, #11 Chicago
IL	312-422-3326 A	Bible On Line, Oaklawn
IL	312-738-2785	Life Savior, Chicago
IL	312-879-2751 A	Stewards Ship, Batavia
IL	312-935-6060	Gospel Outreach
KS	913-287-6159 B	Christian Computer Connection
KY	502-361-4774 A	Terrain, Shelbyville
MD	301-997-7163	Christian
MD	301-828-4572 B	Computers For Christ, #3 Baltimore
MD	301-596-0123 C	Computers For Christ, #8 Washington
MD	301-995-0032 C	Computers For Christ, #6 Columbia
MI	616-891-8488	Christ I Serve, Caledonia
MI	313-213-1214	One Way
MI	313-459-8375 A	Good News, Plymouth
MI	313-736-8031	City Funt
MN	612-929-6530 A	ICHTHUS, Minneapolis
MS	816-796-6857	The Word
MS	816-532-0984 B	Dove Christian, Smithville
MS	314-947-0895 A	Christian, St. Louis
NH	603-644-2255 A	Narrow Way, Manchester
NJ	201-528-6623	Forum-80
NY	913-537-7173 A	What's the Good News?, Manhatten
NY	609-448-5907 B	
NY	716-694-7351 A	City Gates East, Tonawanda
NY	516-878-8319 C	The Electronic Angel, Long Island
ND	702-457-4710	John The Baptist
PA	412-344-1315 A	Computers For Christ, Pittsburg
PA	412-391-0395	Computers For Christ, #12
PA	412-836-8407 A	S.O.A.R., Greensburg
PA	215-932-8829 A	Penn Church Board, Oxford
PA	215-547-4345	Haven of Rest, Levittown
PA	215-365-2967	Bullwinkle's Corner
PA	215-348-9589	Mars Hill
PA	215-785-2268	Resurrection Connection
PA	215-857-9588	The Lighthouse
TX	512-926-5414 A	The Dove Works, Austin
TX	512-345-3282 B	Austin Christian, Austin
TX	214-271-2487 B8	Informed Christian Net,DALLAS
TX	214-422-2387 C8	Ministry Board, Dallas
TX	214-234-8847 C8	Sheperd's Flock, Dallas
TX	214-271-3474 B8	Fish Net, Dallas
TX	214-276-1330 A	Ice Palace, Dallas
TX	817-284-5725	Churchmouse
TX	817-572-6397 A	Good News, Ft. Worth
TX	817-924-5442 A	The Kingdom BBS
TX	817-796-6857 A	The Word
TX	713-721-0888 B	J.L. Christian, Houston
VA	804-226-0441 B	The Resistance Board, Richmond
VA	804-286-2929	Kamas
WI	414-834-4450 B	Nightlink, OCONTO
CANADA		
416-634-6085	D	- Good News Info System, Burlington (Ontario)
416-924-0438		Searchers, Toronto (Ontario)
705-253-5366	A	- Fisherman's Scroll, Sault Ste. Marie (Ontario)
ENGLAND		
011-4439-527-2611		- B - Computers For Christ #9, Exmouth

LEGEND: A = 300 baud, B = 300/1200 baud, C = 300/1200/2400, 8 = 8N1, 7 = 7E1, N= NEW SINCE LAST UPDATE, D= DELETE

Figure 1—Religiously-oriented bulletin boards.

AREA / TITLE	TOPIC OF DISCUSSION	COVERAGE	MEMBERSHIP
1 / General	General chatter	Local	Public
2 / Tech	Technical stuff	Local	Public
3 / Maranatha	Christian beliefs	Local	Public
4 / The Marke t	Items for sale	Local	Public
5 / Billboard !	Announcements, Events	Local	Public
6 / Matrix	FidoNet Mail Area	-net-	$ubscription
7 / Sports	Sports	Local	Public
8 / NY Sales	Non-commercial sales	EchoMail	Public
9 / BikeNet	Bicycling	EchoMail	Public
10/ Cooking	International Conf.	EchoMail	Public
11 / Recovery	Alcoholism Recovery	EchoMail	Public
12 / Bible	International@Conf.	EchoMail	Public
13 / Opinion	Politics, whatever...	EchoMail	Public
14 / Please!	Child Abuse	EchoMail	Public
15 / Science	Science Fact/Theory	EchoMail	Public
16 / Trek	Star Trek	EchoMail	Public
17 / WNY_Tech	Technical	EchoMail	Public
18 / IBM PS/2	IBM PS/2 Computers	EchoMail	Public
19 / Apple	Apple Computers	EchoMail	Public
20 / Amiga	Amiga Computers @	EchoMail	Public
21 / CBM	Commodore Computers	EchoMail	Public
22 / ValleyNET	Local BBS Network	EchoMail	Public
23 / VNS	ValleyNET SYSOPS	EchoMail	CLOSED
24 / Mission_Board	Missionary NEWS	EchoMail	Public (R/O)
22 / ValleyNET	Local BBS Network	EchoMail	Public
60 / Christ_Net	Christian Fellowship	EchoMail	By Request
61 / Prayer	Prayer Requests	EchoMail	By Request
80 / FWO	For Women Only!	Local	By Request

Figure 2—Conferences supported by NiteWing BBS.

DELPHI Welcomes New Product Manager

General Videotex Corporation (GVC) is pleased to announce that Jon A. Gilbert has joined the company as Product Manager for DELPHI, the company's successful and highly-regarded international information and communication service.

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TEAC FD55GFV (1.2Mb for AT)	99.00
TEAC FD35F (3½", 720K)	99.00
TEAC FD35HFN (1.44Mb, 3½")	139.00
MITSUBISHI 4853 (1.0Mb, DS/Quad)	65.00
MITSUBISHI MF355B-88UF (1.44Mb, 3.5", for AT)	149.00

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WESTERN DIGITAL WD1002-WX1 (XT)	$ 69.00
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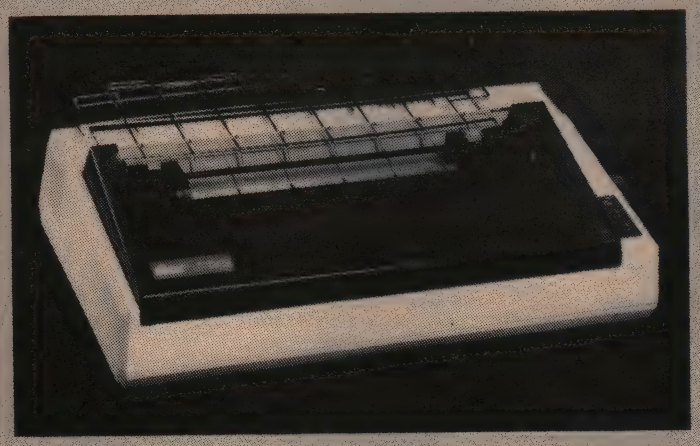

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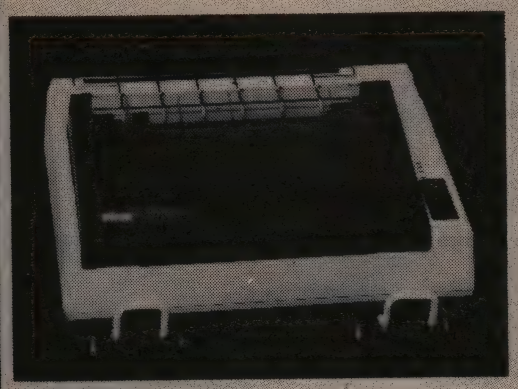

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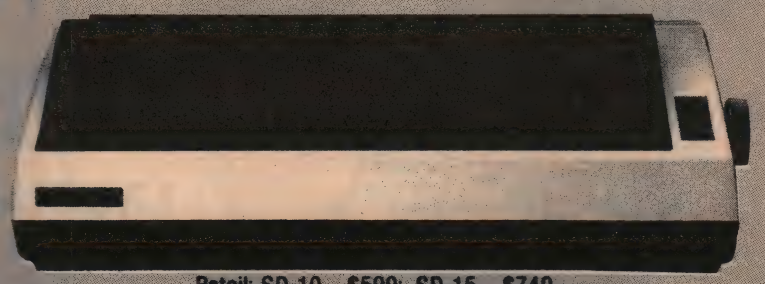

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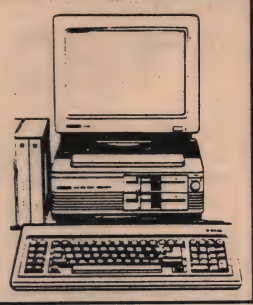

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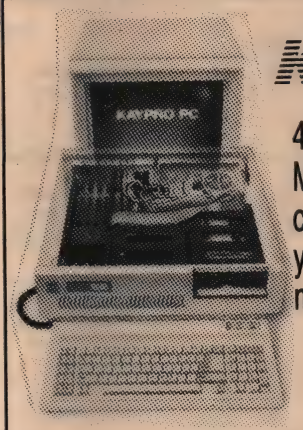

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Users Groups

The User Group is a regular feature of the *Computer Shopper*. This is where you can list your computer user group at no charge. If you would like to have your group listed, please follow the instructions listed below. All information has been supplied by a group officer and is necessarily -- remember the lead time for publishing -- at least six weeks old.

FOG (P. O. Box 3474, Daly City, CA, 94015, data: 415-755-8315) is THE International Nonprofit Computer Users Group and is devoted to the enhancement of the computer experience. Membership in **FOG** is $25 per year and includes a subscription to one of the **FOG** publications and much more. If you are interested in more information about **FOG, send a large SASE** to the address above.

This listing is provided by **FOG** members for the computer community. Regardless of what other groups a user belongs to, a local group can provide valuable assistance in learning more about your computer. Use this listing to find the groups of value to you.

How To Use This Listing

Each group is listed only once, either under a state and area code (or country) or as a Special Interest Group (not limited to a geographic area). Information supplied by a group officer determines how the group is listed. All listings are in state, area code, and city sequence. Foreign countries and SIGs are listed last.

In the event that you live near a state border, be sure to check the listings for BOTH states when searching for a group. For example, residents of the Washington, DC area should check **DC 202, MD 301**, and **VA 703**. Many users should also check the last page of these listings for the SIGs.

Submission Policy

All user group entries must be submitted in **writing** by the first of every month. **Submissions received by the first of April (at FOG** office) the will appear in the July issue. The listing will be good for three issues. **If an update report is not received** every three months, the listing will be deleted. Once their group is on the list, some groups just add **FOG** to their mailing list. Please remember that we can only scan most newsletters so be sure to highlight any changes. Group officers are responsible for promptly forwarding accurate information to:

FOG
User Group listing
P. O. Box 3474
Daly City, CA 94015-0474

For faster handling, please reference the number assigned to each group.

We are not responsible for errors published in these listings.

Urgent Notice:

All phone number shown in this listing of user groups are VOICE numbers. Some are daytime fones, some evening fones but in all cases, common sense should be used when calling these numbers. Don't call after 9pm or before 9am LOCAL TIME. Remember, one day you may be the contact for the group!

United States

AK 907

FOG A.M.O. 63--Ankor-Guide Computer Group (Ankor-Guide), P. O. Box 210089, Anchorage, AK 99521-0089. 907-278-3138 Supporting CP/M MS-DOS.

1066-Amiga User's Group in Alaska (AUGA), c/o Wolfgang Kurtz, P. O. Box 211511, Anchorage, AK 99521-1511. 907-561-6661 Supporting Amiga.

FOG A.M.O. 83--Baranof Users' Group (BUG), c/o Irene Shuler, Box 438, Sitka, AK 99835. 907-747-8615 Supporting CP/M.

AL 205

1058-Birmingham IBM PC User Group, P. O. Box 19248, Birmingham, AL 35219. Supporting MS-DOS.

FOG A.M.O. 49--First Alabama O U G (FAOUG), c/o Ed Burquez, 303 North Hwy 47, Columbiana, AL 35051. 205-669-5200 Supporting CP/M MS-DOS.

FOG A.M.O. 125--North Alabama Osborne Users Group (NAOUG), c/o John Heaman, 8705 Valley View Drive S.E., Huntsville, AL 35802. 205-881-0377 Supporting CP/M MS-DOS.

140-South, Mobile & Alabama Users Grou (SMAUG/99), c/o Pete Smith, 2006 Riverside Drive, Mobile, 36605 36426. 205-867-7193 Supporting TI99/4A.

AR 501

145-Arkansas Software Lending Library, c/o L. Bland. 501-329-6933 Supporting IBM-PC.

827-Northwest Ark Microcomputer User G (NWA-MCUG), c/o R.G. Koelling, 14 Carroll Drive, Bella Vista, AR 72714-3219. 501-855-3669 Supporting MS-DOS.

995-Missouri, Oklahoma & Arkansas TI U (MOArk 99'ers), c/o Pauline Darling, Rt 12, Box 27 #188, Fayetteville, AR 72703. 501-443-2145 Supporting TI 99/4A.

FOG A.M.O. 23--Arkansas FOG (AFOG), c/o Data-Tronics Corp., Box 853, Fort Smith, AR 72902-0853. 501-785-8600 Supporting CP/M MS-DOS.

309-Little Rock CP/M-MS/DOS Tech User, c/o Elmer A. Wingfield, 26 Belmont Drive, Little Rock, AR 72204. 501-565-3798 Supporting CP/M MS-DOS.

914-Jonesboro User Group (JUG), c/o Larry Heyl, P.O. Box 838, State University, AR 72467. 501-932-6979 Supporting all systems.

AZ 602

FOG A.M.O. 100--Tempe Osborne Group (TOG), c/o Sergent, Hauskins & Beckwith, 3232 West Virginia, Phoenix, AZ 85009. 602-947-7646 Supporting CP/M MS-DOS.

614-Commodore User Group of Arizona (COUGAR), c/o Bob Spriet, P. O. Box 21291, Phoenix, AZ 85036. 602-893-2133 Supporting Commodore.

650-Phoenix Area Commodore Club (PACC), c/o Jack Adey, P. O. Box 34905, Phoenix, AZ 85067. 602-978-3177 Supporting Commodore.

1055-Amiga Arizona user group (AmAz!), c/o Stan Krawczyk, P. O. Box 822371, Phoenix, AZ 85071. 602-938-9736 Supporting Amiga.

1074-Vista IBM PC Users Group, c/o John Sebens, 821 N. Buckhorn Drive, Sierra Vista, AZ 85635. Supporting MS-DOS.

311-Arizona Commodore Users Group (ACUG), c/o Dave Thornton, P. O. Box 27201, Tempe, AZ 85282. 602-839-4557 Supporting Commodore.

572-Tuscon Apple Core (TAC), P. O. Box 41795, Tuscon, AZ 85717. 602-884-7402 Supporting Apple Macintosh.

CA 209

1070-Computer User's and Enthusiasts (CUE), Manteca, CA. 209-858-4401 Supporting MS-DOS.

623-Valley Computer Club (VCC), c/o Pro-Consul Inc., 11306 Scarlett Oak Road, Oakdale, CA 95361. 209-847-9411 Supporting all Commodore systems.

FOG A.M.O. 66--South Valley FOG (SVFOG), c/o Olson Computer Services, 1502 North Lowery Street, Porterville, CA 93257. 209-781-4123 Supporting CP/M MS-DOS.

1016-Mother Lode Commodore User's Group, c/o Larry Anderson, P. O. Box 1286, San Andreas, CA 95249. 209-754-5530 Supporting 8-bit Commodore.

FOG A.M.O. 139--Stockton Commodore 64 Users Group (C-64), c/o Jack & Rita McCann, 2929 Calariva Drive, Stockton, CA 95204. 209-477-8565 Supporting CP/M Commodore.

CA 213

51-Long Beach Amiga User's Group (LBAUG), c/o Larry Blair, 5115 Via Veranada, Long Beach, CA 90805. 213-422-8226 Supporting Amiga.

84-Long Beach Business Users Group (LBUGS), c/o Kassay Accounting Service, 3227 Ladoga Avenue, Long Beach, CA 90808. 213-595-6341

CA 408

314-Gavilan Users Group, c/o R. W. Brown, 780 Manx Avenue, Campbell, CA 95008. 408-379-2774 Supporting Gavilan.

315-Byte Bandits of America, c/o R. W. Brown, 780 Manx Avenue, Campbell, CA 95008. 408-379-2774 Supporting TandyTRS-80.

313-Timex Sinclair Silicon Valley User (GUTS/SV), c/o Bill Miller, 6675 Clifford Drive, Cupertino, CA 95014-4530. 408-253-3175 Supporting Timex/Sinclair.

377-Novell Users Group (NUG), P. O. Box 360872, Milpitas, CA 95035-0872. 408-998-8821 Supporting all networks (MS-DOS).

FOG A.M.O. 5--Monterey Bay Area O U G (MBAOUG), c/o Ken Roberts, 30 Linda Vista Drive, Monterey, CA 93940. 408-728-1416 Supporting CP/M MS-DOS.

833-Bay Area Atari Users Group (BAAUG), P. O. Box 50459, Palo Alto, CA 94303. Supporting Atari.

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Users Groups

FOG A.M.O. 116--Microcomputer Users of Santa Cruz (MUSC), c/o Rosemary Faitos, 105 Weeks Avenue, Santa Cruz, CA 95060. 408-476-0504 Supporting CP/M MS-DOS.

80-Santa Cruz Kaypro Users Group (SCKUG), c/o Keith Redfield, 1005 Cedar Street, Santa Cruz, CA 95060. 408-425-7166 Supporting Kaypro.

FOG A.M.O. 1--First FOG of Silicon Valley (1st FOG SV), c/o Glen W. Stinnett, 21240 Canyon View Drive, Saratoga, CA 95070. 408-371-8699 Supporting CP/M MS-DOS.

1060-Ft. Ord Commodore USers (FOCUS), c/o Michael Bryant, P. O. Box 2180, Seaside, CA 93955-2180. 408-384-9416 Supporting Commodore.

CA 415

629-Marin Sonoma PC Users Group (MSPCUG). 415-525-8500 Supporting MS-DOS.

31-Bay Area MicroDecision User's Asso (BAMDUA), P. O. Box 5152, Berkeley, CA 94705. 415-534-4257 Supporting Morrow.

126-Berkeley Macintosh Users Group (BMUG), 1442A Walnut Street Suite 62, Berkeley, CA 94709. 415-849-9114 Supporting Macintosh.

FOG A.M.O. 68--San Mateo Osborne Group (SMOG3), c/o Philip A. Moore, 1331 Crane Street, Menlo Park, CA 94025. 415-325-2442 Supporting CP/M.

FOG A.M.O. 31--Marin Osborne Group (MOG), P. O. Box 1726, Novato, CA 94948. 415-897-0629 Supporting CP/M MS-DOS.

FOG A.M.O. 3--East Bay FOG (EBFOG), c/o Patricia Watters, 5497 Taft Avenue, Oakland, CA 94618. 415-272-9099 Supporting CP/M MS-DOS.

594-Bay Area NEC/100 User's Group, c/o Truly Portable, P. O. Box 2916, Oakland, CA 94609. 415-658-1889 Supporting NEC 8201A & Tandy 100.

320-CLUB 100: Model 100 Users Group (CLUB 100), c/o Richard Hanson, P. O. Box 23438, Pleasant Hill, CA 94523. 415-932-8856 Supporting TRS-100/102/200.

FOG A.M.O. 2--San Francisco Computer Society (SFCS), P. O. Box 783, San Francisco, CA 94101-0783. 415-929-0252 Supporting CP/M MS-DOS.

35-Epson Users of San Francisco (EUSF), c/o Chet, 1235 -- 31st Avenue, San Francisco, CA 94122. 415-681-8300 Supporting Epson CP/M MS-DOS.

153-IBM AT/XT Clone User Group, P. O. Box 15000/324, San Francisco, CA 94115. 415-861-9321 Supporting MS-DOS.

605-Computer Alliance/Media Alliance, c/o Media Alliance, Ft. Mason Bldg E, Room 205, San Francisco, CA 94123. 415-771-7133

79-Stanford Palo Alto User Group, P. O. Box 3738, Stanford, CA 94305. 415-322-3850 Supporting MS-DOS.

162-SCPCUG (SCPCUG), P.O. Box 499, Union City, CA 94587. 415-489-1372 Supporting MS-DOS.

FOG A.M.O. 60--Mt. Diablo Osborne Group (MTDOG), c/o Larry's Booknook, 730 - A Bancroft Road, Walnut Creek, CA 94598. 415-933-2665 Supporting CP/M.

CA 619

775-LA MAC, c/o Dick or John Mac, 5515 Jackson Drive #3, La Mesa, CA 92042. 619-226-5732

FOG A.M.O. 130--San Diego Osborne Users (SDOU), c/o Worswick Industries, 4898 Ronson Court, San Diego, CA 92111. 619-299-5769 Supporting CP/M MS-DOS.

32-San Diego Computer Society (SDCS), P. O. Box 81444, San Diego, CA 92138. 619-284-5196 Supporting all systems.

826-Group Buying Service (GBS), P. O. Box 19364, San Diego, CA 92119-0364. 619-226-5732

FOG A.M.O. 114--High Desert Osborne Group (HOG), c/o Johnson - McClure Computing, 71845-A 29 Palms Hwy, Twentynine Palms, CA 92277. 619-367-2440 Supporting CP/M MS-DOS.

CA 707

FOG A.M.O. 6--Microcomputer U G of Solano & Yolo (MUGSY), c/o Ron Forsythe, P. O. Box 1011, Fairfield, CA 94533. 707-446-6643 Supporting CP/M MS-DOS.

918-Fairfield Commodore Users Group (FCUG), P. O. Box 2778, Fairfield, CA 94533-9998. Supporting Commodore.

FOG A.M.O. 29--Humboldt Osborne Group (HOG), c/o R C Electronics, P. O. Box 2751, McKinleyville, CA 95521. 707-445-2074 Supporting CP/M MS-DOS.

FOG A.M.O. 56--North Bay FOG (NBFOG), c/o Mrs. E C (Teddy) O'Malley, 3274 Holland Drive, Santa Rosa, CA 95404. 707-546-1797 Supporting CP/M MS-DOS.

647-Santa Rosa Commodore Users Group, P. O. Box 5830, Santa Rosa, CA 95402-5830. 707-584-7009 Supporting Commodore.

695-Solano Community PC Club (SCPCC), c/o Solano Community College, 4000 Suisun Valley Road, Suisun City, CA 94585-0246. 707-422-1131 Supporting MS-DOS.

CA 714

723-Amstrad PCW SIG, c/o Al Warsh, 12472 Reche Canyon Road #93, Colton, CA 92324. 714-370-0359 Supporting AmstradPCW.

FOG A.M.O. 113--North Orange County C C Osborne SI (NOCOSIG), c/o Scott Cosel, 9091 Holder Street, #128, Cypress, CA 90630-5855. 714-952-5627 Supporting CP/M MS-DOS.

1014-Users Group of Orange County (UGOC), 17301 Santa Isabel Street, Fountain Valley, CA 92708. 714-637-7410 Supporting TI 99/4A.

589-T I Riverside User Group, c/o Ed Butcher, 7125 Deleware Street, Riverside, CA 92504. 714-686-0336 Supporting TI99/4A, Geneve 9640.

1044-So. Cal Timex Sinclair Enthusiasts (SCATE), c/o John McDonnell, P. O. Box 1741, Upland, CA 91786. 714-985-1111 Supporting Timex Sinclair.

CA 805

FOG A.M.O. 42--Central Coast Computer Club (Four Seas), c/o Burt L. Fielding, APDO Postal #95, Ajijic, JALISCO, MEXICO. 805-937-1128 Supporting CP/M MS-DOS.

648-Kern Independent PC User Group (KIPUG), P. O. Box 2780, Bakersfield, CA 93303. 805-871-7838 Supporting MS-DOS.

760-Bakersfield Area Commodore Users S (ABACUS), P. O. Box 40334, Bakersfield, CA 93384. 805-871-8245 Supporting Commodore.

1033-Santa Barbara Commodore Users Grou, c/o John Kalstrom, 6237 Cumberland Drive, Goleta, CA 93117. Supporting Commodore.

FOG A.M.O. 47--Central Coast Osborne Group (CCOG), c/o Melvin Johnson, 1836 10th Street, Los Osos, CA 93402. 805-528-2382 Supporting CP/M.

163-Slo Bytes IBM PC User's Group (SloBytes), c/o Bob Ward, 2100 Andre Avenue, Los Osos, CA 93402. 805-528-0121 Supporting IBM-PC.

FOG A.M.O. 69--Osborne Santa Barbara Users Group (OSBUG), c/o Jarry Bartz, 650 Aurora Avenue, Santa Barbara, CA 93109. 805-965-4343 Supporting CP/M MS-DOS.

559-Atari Federation User Group, c/o Shirl Dellinger, P. O. Box 5367, Vandenburg AFB, CA 93437. 805-734-2451 Supporting Atari.

965-Ventura PC Users Group (VPCUG), c/o Andy Chakires, 371 Poli Street, Ventura, CA 93001. 805-653-5358 Supporting MS-DOS.

CA 818

770-Amiga Tech Users Group (ATUG), c/o Mark Randall. 818-355-6111 Supporting Amiga.

991-San Gabriel Valley Tandy Users Grp (SAGATUG). 714-592-4178 Supporting all Radio Shack models.

483-Pasadena Commodore Computer Club (PCCC), P.O.Box 1163, Arcadia, CA 91006. 818-447-2212 Supporting Commodore.

613-Valley Computer Club, c/o Aaron, P. O. Box 6545, Burbank, CA 91510-6545. 818-769-1837 Supporting all systems.

323-San Fernando Valley 99ers, 2823 Sanborn Avenue, La Crescenta, CA 91214. 818-248-9558 Supporting TI99/4A.

676-Valley TRS-80 Users Group (VTUG), c/o Fred, P. O. Box 7113, Mission Hills, CA 91346. 818-346-7024 Supporting Radio Shack 1, 3, 4/4P/4D & LoboMax.

FOG A.M.O. 106--Technical & User Groups Network (TUG-NET), 12125 Riverside Drive #205, North Hollywood, CA 91607. 818-894-7835 Supporting CP/M MS-DOS.

928-Valley TRS 80 Hackers Group (VTHG), P. O. Box 9747, North Hollywood, CA 91609. 818-982-0467 Supporting Radio Shack 1, 3, 4/4P/4D & LoboMax.

FOG A.M.O. 86--Osborne National Users Group (ONUG), c/o Alicia Fahey, P. O. Box 424, Northridge, CA 91328. 818-709-6202 Supporting CP/M MS-DOS.

FOG A.M.O. 84--Osborne Komputer Owners Klub (OKOK), P. O. Box 40429, Pasadena, CA 91104-7429. 818-794-3243 Supporting CP/M MS-DOS.

324-Pasadena IBM Users Group, 711 East Walnut Street, Pasadena, CA 91101. 818-795-2300 Supporting MS-DOS.

326-San Gabriel Valley TRS-80 Users Gr (SAGATUG), c/o John Phillip, 815 South Walnut Avenue, San Dimas, CA 91733. Supporting TandyTRS-80.

927-CoCo 1-2-3, c/o Harry Tischler, 7560 Woodman Place # E8, Van Nuys, CA 91405. 818-997-6000 Supporting CoCo.

CA 916

956-Northern California Amiga Club (NCAC), c/o David L. Murphy, P. O. Box 54, Bella Vista, CA 96008. 916-472-3237 Supporting Amiga.

830-Redding Atari Computer Enthusiasts (R.A.C.E.), P.O. Box 818, Cottonwood, CA 96022. 916-243-5189 Supporting Atari.

FOG A.M.O. 61--Sacramento Osborne Group (SOG), P. O. Box 660787, Sacramento, CA 95866-0787. 916-482-8804 Supporting CP/M MS-DOS.

1045-Sacramento Microcomputer User's Gr (SMUG), P. O. Box 16153, Sacramento, CA 95816. Supporting CP/M MS-DOS Unix 68K.

CO 303

FOG A.M.O. 4--DOG Computer Club (DOG), c/o Bob Mesenbrink, 9098 West 77th Place, Arvada, CO 80005. 303-752-1353 Supporting CP/M MS-DOS.

687-CP/M SIG, P. O. Box 633, Broomfield, CO 80020-0633. 303-494-8068 Supporting CP/M MS-DOS.

FOG A.M.O. 133--Colorado Springs Osborne Group (CSOG), c/o James R. Sheldon, 2412 Sturgis Road, Colorado Springs, CO 80909. 303-473-7647 Supporting CP/M MS-DOS.

328-Front Range 99'er Computer Club, P. O. Box 9572, Colorado Springs, CO 80932. 303-576-3199 Supporting TI99/4A.

700-Pueblo Atari ST Enthusiasts (PASTE), c/o Bill Renkel Jr., 3186 South Osceola, Denver, CO 80236. Supporting Atari.

1017-P.C. Compatible & Sanyo Users Grou, c/o Byron Fenton, 1848 So. Eliot Street, Denver, CO 80219. 303-936-0920 Supporting MS-DOS Sanyo.

FOG A.M.O. 115--Fort Collins Osborne Group (FTCOG), c/o Tom Noonan, 209 East Swallow, Fort Collins, CO 80525. 303-226-4156 Supporting CP/M.

CT 203

839-ST Atari Road Runners (STARR), c/o Madelon Wilson, 15 John Street, Ansonia, CT 06041. Supporting Atari.

440-Nutmeg TI-99ers, c/o Janet Ryan, 10 Jolly Road, Ellington, CT 06029. 203-875-1647 Supporting TI99/4A.

822-CT IBM Personal Computer User's Gr, c/o John McGinley, P. O. Box 291, New Canaan, CT 06840. 203-762-0229 Supporting MS-DOS.

617-Fairfield County Computer Users Gr (FCUG), c/o Alan Abrahamson, 10 Richlee Road, Norwalk, CT 06851. 203-866-7883 Supporting TRS Tandy MS-DOS.

971-Central Conn. PC (PCjr) Group, c/o Ted Melinosky, 525 Foster Street, South Windsor, CT 06074-2936. 203-644-2358 Supporting PCjr.

FOG A.M.O. 40--Western CT Microcomputer Users' Gr (WC/MUG), c/o 48 Winston Drive, P.O. Box 186, Washington Depot, CT 06794-0186. 203-775-1102 Supporting CP/M MS-DOS.

1018-Naugatuck Valley Commodore Users G (NVCUG), P. O. Box 622, Waterbury, CT 06720. 203-582-5093 Supporting Commodore.

FOG A.M.O. 54--Yankee Osborne Users Group (YOU), c/o Daryl Gehlbach, 222 Griswold Drive, West Hartford, CT 06119. 203-523-0345 Supporting CP/M MS-DOS.

DC 202

1027-North Star User's Group, c/o Burt Andrews. 202-299-3469 Supporting North Star.

984-National Capital Amiga Users Group (NCAUG), P. O. Box 12360, Arlington, VA 22209. 301-231-3517 Supporting Amiga.

220-Capital PC Users Group, 4520 East-West Hwy, Suite 550, Bethesda, MD 20814. 301-656-8372 Supporting MS-DOS.

1077-Washington Apple Pi, 8227 Woodmont Avenue, Sutie 201, Bethesda, MD 20814. 301-654-8060 Supporting Macintosh Apple.

DK-8

1056-Randers Computer Club (RCC), Udbyhajvej 150, Randers, DK-8900, DENMARK. Supporting CP/M Commodore Amstrad.

FL 305

908-PC Users Group of Boca Raton, Inc., P.O. Box 273421, Boca Raton, FL 33247. Supporting MS-DOS.

334-Atari Computer Club of Palm Beache, c/o Jim Woodward, P.O. Box 1526, Boynton Beach, FL 33435. Supporting Atari.

779-South Florida Kaypro User's Group (SFKUG), c/o Becky Laman-Hynes, 688 NE First Street, Dania, FL 33004. 305-384-8300 Supporting Kaypro.

180-FWB Apple Users Group (FWBAC), c/o Bruce R. Aplin, 8 Michael Court, Ft Walton Beach, FL 32548. 904-862-3047 Supporting Apple.

813-South Florida Computer Group (SFCG), c/o Joe Ruby, P. O. Box 5684, Ft. Lauderdale, FL 33310-5684. 305-972-6676 Supporting MS-DOS Apple CP/M Amiga Atari.

87-Central Florida Computer Society (CFCS), P. O. Box 8019, Maitland, FL 32751. 305-862-1329 Supporting all systems.

685-El-Shift-Oh Inc., P. O. Box 361348, Melbourne, FL 32936-1348. 305-773-1904 Supporting Commodore.

134-Space Coast Apple Users' Group Inc, c/o Elmer Whalley, P. O. Box 542112, Merritt Island, FL 32954-2112. 305-452-8357 Supporting Macintosh Apple.

FOG A.M.O. 26--Gold Coast Computer Group (GCCG), P. O. Box 661256, Miami, FL 33266-1256. 305-888-3154 Supporting CP/M MS-DOS.

Users Groups

129-Miami Individuals w/Commodore Equi (MICE), 11110 Bird Road, Miami, FL 33165. 305-221-7115 Supporting Commodore.

1019-Commodore Association User Group (CAUG), c/o Juan Poggio, 11491 SW 103 Street, Miami, FL 33176. 305-279-9145 Supporting Commodore.

585-Miami Users Group, c/o Burt Schreiber, 19301 NE 19th Avenue, North Miami Beach, FL 33179. 305-931-3644 Supporting TI99/4A.

FOG A.M.O. 16--Greater Orlando Computer U G (GOCUG), c/o Martyn W. Simpson, 8142 Steeplechase Blvd., Orlando, FL 32818. 305-295-5689 Supporting CP/M MS-DOS.

1005-Central Florida Amiga Club (CFAC), 4641 Salvia Drive, Orlando, FL 32809. 305-352-0951 Supporting Amiga.

1046-Mid FL Atari Computer Club, c/o Bill Baker, 2706 Rose Blvd, Orlando, FL 32809. 305-855-7080 Supporting Atari.

FOG A.M.O. 91--Ft. Lauderdale Computer Users Grou (FLCG), c/o Stephen Matus, 8461 NW 31st Place, Sunrise, FL 33351. 305-748-7237 Supporting CP/M MS-DOS.

333-Space Coast PC Users Group (SCPCUG), P. O. Box 396, Titusville, FL 32781-0396. 305-269-7815 Supporting MS-DOS.

FL 813

FOG A.M.O. 46--Tampa Bay Osborne Group (TBOG), c/o David W. Hardiman, 464 West Overbrook Street, Belleair Bluffs, FL 34640. 813-584-4185 Supporting CP/M MS-DOS.

FL 904

673-Hernando/Citrus PC Users Group, c/o Joseph Gatti, P. O. Box 1106, Brooksville, FL 34605. 904-799-4094 Supporting MS-DOS.

1047-Emerald Coast Adam User's Group, c/o Faye Deere, P. O. Box 4934, Ft. Walton Beach, FL 32549-4934. 904-244-1516 Supporting Coleco ADAM.

FOG A.M.O. 98--Jacksonville Osborne Users Group (JOUG), c/o Jacksonville Electric Authorit, 233 W. Duval Street, Jacksonville, FL 32201. 904-633-4750 Supporting CP/M MS-DOS.

104-Timex Sinclair Users Group, c/o John Kuhn, 1707 King Street, Jacksonville, FL 32204. Supporting Timex/Sinclair Amstrad QL TimexCP/M.

FOG A.M.O. 10--Pensacola FL Osborne Group (PFOG), c/o James W. Greene, 6230 Vicksburg Drive, Pensacola, FL 32503. 904-476-8083 Supporting CP/M MS-DOS.

777-Commodore User Group of Pensacola (CUGOP), P. O. Box 3533, Pensacola, FL 32516. 904-932-5080 Supporting Commodore.

1068-Pensacola PC Developers Group, c/o Valerie Baxter, 4659 Oakland Cr., Pensacola, FL 32506. 904-453-3840 Supporting dBASE & tools.

FOG A.M.O. 77--Tallahassee CP/M User Group (TCPMUG), c/o Spencer R. Lepley, 1655 Capital Circle S.E. # 12, Tallahassee, FL 32301. 904-878-4592 Supporting CP/M.

GA 404

FOG A.M.O. 93--The Osborne Group of Atlanta (TOGA), c/o William Woollett, 2018 Bramblewood Drive N.E., Atlanta, GA 30329. 404-457-4775 Supporting CP/M MS-DOS.

663-Atlanta IBM-PC Users' Group Inc., P. O. Box 28788, Atlanta, GA 30358. 404-446-6611 Supporting MS-DOS.

732-Organization of Atlanta SysOps Inc (OAS), P. O. Box 80425, Conyers, GA 30208. Supporting remote systems, telecommunications.

963-LaGrange Area Micro Users Group (LAMUG), c/o Daniel H. Jones, 262 East Lakeview Drive, LaGrange, GA 30240. 404-884-4563 Supporting MS-DOS Apple.

HI 808

FOG A.M.O. 124--Hawaii Island Computor Assoc (HIFOG), c/o Shayne Enterprises, P.O. Box 895, Hilo, HI 96721-0895. 808-935-8678 Supporting CP/M.

94-Aloha Computer Club, P. O. Box 4470, Honolulu, HI 96812-4470. 808-537-2153 Supporting CP/M MS-DOS Heath/Zenith.

IA 319

FOG A.M.O. 102--Quad City All Computers Users Grou (QC/ACUG), c/o Robert H. Lay, 1005 Canterbury Court, Davenport, IA 52806. 319-386-3484 Supporting CP/M MS-DOS.

447-Waterloo Area Commodore Club, c/o Steven D. Olsen, P.O. Box 2254, Waterloo, IA 50704. Supporting Commodore.

462-Blackhawk Atari Computer Enthusias (BACE), c/o Steven Heyer, 220 Sherman, Waterloo, IA 50703-2541. 319-233-1662 Supporting Atari.

IA 515

FOG A.M.O. 12--Midwest FOG (MWFOG), c/o Dale A. Thatcher, 8031 Garrison Road, Des Moines, IA 50322. 515-276-7869 Supporting CP/M MS-DOS.

863-Ft. Dodge Commodore Users Group (FDCUG), c/o Ed Zimmerle, 1606 -- 2nd Ave North, Ft. Dodge, IA 50501. Supporting Commodore.

IA 712

FOG A.M.O. 38--Siouxland Osborne Group (SOG), c/o Gary Shaner, 3101 Norman Drive, Sioux City, IA 51104. 712-252-2182 Supporting CP/M MS-DOS.

968-Tricomm Computer Users Group, P. O. Box 4527, Sioux city, IA 51104. Supporting Commodore.

ID 208

1006-Amiga Users of Southwestern Idaho (AUSI), c/o Edwin Apel, 1451 Oriole Way, Boise, ID 83709-1324. 208-376-1500 Supporting Amiga.

IL 217

845-TI 99/4a Users Group (WW99ER's), c/o Marc C. Levine, 3 Genevieve Lane, Champaign, IL 61821-7213. 217-351-0943 Supporting TI-99/4A.

IL 309

1008-Quad City PC User's Group, P. O. Box 464, Bettendorf, IA 52722. 309-764-8253 Supporting MS-DOS.

953-Quad City Computer Club (QCCC), 1005 -- 16th Street, Rock Island, IL 61201. 309-786-9635 Supporting Tandy.

IL 312

782-Southwest Regional Area Programmer (SW.R.A.P./64), c/o T. O. Olson, P. O. Box 342, Bedford Park, IL 60499-0342. 312-656-7381 Supporting Commodore.

FOG A.M.O. 80--Chicago's First Osborne Group (CFOG), P. O. Box 1678, Chicago, IL 60690. 312-726-3569 Supporting CP/M MS-DOS.

188-Chicago Area Computer Hobbyist Exc (CACHE), 323 S. Franklin #804 Box C-176, Chicago, IL 60606-7092. 312-653-4114 Supporting all systems.

350-Chicago Computer Society, P. O. Box 8681, Chicago, IL 60680-8681. 312-794-7737 Supporting MS-DOS.

592-Fox Valley Pet (Commodore) User Gr (FVP(C)UG), c/o Herb Gross, 833 Prospect, Elgin, IL 60120. 312-695-1316 Supporting Pet Commodore.

680-Lake County Amiga Users Group, c/o Philip R. Brauer, 0261 Elmwood Ave., Mundelein, IL 60060. 312-566-8846 Supporting Amiga.

IL 618

355-IBM Jr User Group, P. O. Box 8012, Alton, IL 62002. Supporting PCjr.

354-Little Egypt Apple Users Group, P. O. Box 1122, Murphysboro, IL 62966. 618-684-4481 Supporting Apple.

IN 219

1052-Northern Indiana Apple Users Group (NInAUG), c/o Lee Langner, 3218 Eder Street, Highland, IN 46322. 219-923-3839 Supporting Apple.

992-Michiana Amateur Computer Society (MACS), c/o Don Lyons, P. O. Box 2171, Michigan City, IN 46360. 219-872-3610 Supporting all systems.

1051-Rochester Commodore Computer Club (RC3), c/o Curt Henriott, 428 Clay Street, Rochester, IN 46975. 219-223-5706 Supporting Commodore Vic-20 Amiga.

IN 317

850-First Laser-Apple Group (F.L.A.G.), P.O. Box 1022, Crawfordsville, IN 47933. Supporting Apple & Apple compatibles.

FOG A.M.O. 126--The Central Indiana Kaypro-Osborne (CIKOG), c/o William B. Gillette, 6448 N. Ewing Street, Indianapolis, IN 46220. 317-253-9509 Supporting CP/M MS-DOS.

357-IBM PC Users Group, Inc, P. O. Box 2532, Indianapolis, IN 46206. 317-897-5166 Supporting MS-DOS CP/M Apple Commodore Tandy.

573-Texas Instrument Hoosier User Grou (TI-HUGgers), P. O. Box 2222, Indianapolis, IN 46206-2222. 317-787-4184 Supporting TI99/4A.

1007-Commodore Hardware Users Group (C*H*U*G), c/o David White, P. O. Box 19637, Indianapolis, IN 46219. 317-862-4960 Supporting all Commodores.

FOG A.M.O. 34--Hoosier Osborne Group (HOG), c/o Peter Cook, 1903 East 430 South, Lafayette, IN 47905. 317-494-1914 Supporting CP/M.

IN 812

FOG A.M.O. 87--Indiana Osborne Group (IOU), c/o Charles C. Foster, 4041 East Bethel Lane, Bloomington, IN 47401. 812-334-3234 Supporting CP/M MS-DOS.

1031-BLoomington Atari ST users group (BLAST), P. O. Box 1111, Bloomington, IN 47401-1111. Supporting Atari ST.

193-Nationserv Users Group, c/o Ben Nation, 3960 Covert Avenue, Evansville, IN 47715. 812-477-5340 Supporting MS-DOS Commodore Tandy (BBS Only!).

KS 316

FOG A.M.O. 137--Hutchinson Computer Hobbyists (HUTCH), c/o Stewart Investments, P. O. Box 374, Hutchinson, KS 67504. 316-662-7704 Supporting CP/M MS-DOS.

FOG A.M.O. 21--Osborne Portable Enthusiast of KS (OPEK), c/o Norm Conley, 2916 West 21st, Wichita, KS 67203. 316-794-2151 Supporting CP/M MS-DOS.

KY 502

1003-Muhlenberg County Commodore Users (MCCUG), P. O. Box 12, Greenville, KY 42345. Supporting Commodore MS-DOS Amiga.

FOG A.M.O. 64--Personal Computer Club - Louisvill (PCCL), c/o David Creed, 1381 Tyler Park Drive, Louisville, KY 40204. 502-459-6127 Supporting CP/M.

1076-Kentuckiana 99/4A Computer Society, P. O. Box 36246, Louisville, KY 40233-6246. 502-491-2974 Supporting TI 99/4A.

KY 606

FOG A.M.O. 32--Kentucky Osborne Group (KOG), c/o Robert A. Gibson, 412 Bristol Road, Lexington, KY 40502. 606-269-1684 Supporting CP/M.

LA 318

697-The Page Commodore User's Group, P. O. Box 7703, Alexandria, LA 71306-7703. 318-473-8611 Supporting Commodore.

463-DeRidder Computer Club, c/o P.O.Box 1377, 212 W. Fourth St., De Ridder, LA 70634. 318-462-1753 Supporting Apple Commodore IBM MS-DOS Tandy.

627-Northeast Louisiana PC Users Group (NELA-PUG), c/o Mike Ravary, P. O. Box 7147, Monroe, LA 71211. 318-323-3710 Supporting MS-DOS.

LA 504

1010-Baton Rouge Atari Group-ST (BRAG-ST), 1955 Dallas Drive, Baton Rouge, LA 70806. 504-924-8066 Supporting Atari ST.

646-New Orleans Personal Computer Club, c/o Gary Shurman, P. O. Box 8364, Metairie, LA 70011. 504-455-5849 Supporting MS-DOS.

788-64'UM Commodore Computer User Grou (64'UM), P. O. Box 6481, Metairie, LA 70009-6481. 504-888-8025 Supporting Commodore.

996-Crescent City - Tech. User's Group (CC-TUG), c/o Tony Johnson, P. O. Box 73182, Metairie, LA 70033-3182. Supporting MS-DOS Commodore Tandy Apple.

MA 413

950-Pioneer Valley 99/4A Users Group, c/o Ray Wenninger, 111 Oakridge Street, Chicopee, MA 01020. 413-593-6951 Supporting TI99/4A.

854-Pioneer Valley PC Users Group, P.O. Box H, N. Amherst, MA 01059. Supporting MS-DOS.

1011-Pioneer Valley Commodore Club (PVCC), c/o David Wolanin, 286 Sackett Road, Westfield, MA 01085. 413-568-0885 Supporting Commodore MS-DOS.

MA 508

1071-Gosub Personal Computer Users Grou, c/o Larry G. Nelson Sr., 130 School Street, Webster, MA 01570-4310. 508-943-1075 Supporting Radio Shack MS-DOS.

MA 617

FOG A.M.O. 122--Boston Osborne Group (BCS SIG) (BOG), c/o John J. DeMeritt, 32 Willow Street, Belmont, MA 02178. 617-484-1863 Supporting CP/M MS-DOS.

889-The Boston Computer Society (BCS), One Center Plaza, Boston, MA 02108. 617-367-8080 Supporting all systems.

1012-MUNCH, c/o Corson Wyman, P. O. Box 7193, Worcester, MA 01605. 617-839-4134 Supporting TI 99/4A.

MD 301

860-Kaypro Users of Baltimore (KUB), P. O. Box 23510, Baltimore, MD 21203. 301-486-8361 Supporting CP/M MS-DOS.

259-Baltimore Sanyo Users Group, c/o David H. Chase, 101 N. Williams Street, Bel Air, MD 21014. 301-879-2406 Supporting Sanyo.

FOG A.M.O. 101--Central MD Microcomputer User's Gr (CMMUG), c/o Paul Demmitt, 9337 Angelina Circle, Columbia, MD 21045. 301-381-4762 Supporting CP/M MS-DOS Commodore.

464-Chusy/Bug User Group, c/o Tom Vervaeke, 12122 Little Patuxent Pkwy., #B, Columbia, MD 21044. 301-381-5406 Supporting MS-DOS.

858-Lexington Park Atari Comp Enthusia (LPACE), c/o John J. Smith, 912 Chancellors Run Road, Great Mill, MD 20634. 301-862-1329 Supporting all Atari.

972-TRS80 '134' Computer Users Group, c/o Paul Shapiro, P. O. Box 2711, White Flint Mall, Kensington, MD 20895-0824. 301-770-7899 Supporting TRS80 model 1, 3, 4.

986-VQ-4pc Users Group, c/o Mike Taylor, 800 D Spyglass Way, Lexington Park, MD 20653. Supporting all systems.

784-COMAL Special Interest Group (SIG), c/o Bob Bain, P. O. Box 2689, Silver Spring, MD 20902. 301-649-5964

785-Montgomery Cty Commodore Comp Soc. (MCCCS), c/o Lenny Schacter, P. O. Box 2689, Silver Spring, MD 20902. 202-291-2189 Supporting Commodore.

ME 207

Users Groups

1069-Northern Maine Commodore Users Grp, P. O. Box 483, Loring AFB, ME 04751. Supporting Commodore.

999-Machias Area Computer Users Group (MACUG), c/o Jim Raymond, 19 Broadway, Machias, ME 04654. 207-255-4978 Supporting all systems.

FOG A.M.O. 136--Southern Maine Osborne-CP/M Users (SMOG), c/o Mason Philip Smith-Photography, P.O. Box 1020, Portland, ME 04104. 207-772-1616 Supporting CP/M.

998-Amiga Users of Southern Maine, P. O. Box 10237, Portland, ME 04104. 207-797-4898 Supporting Amiga.

1073-Southern Maine Commodore Users Grp, c/o Rick Lembree, P. O. Box 416, Scarborough, ME 04074-0416. 207-967-3381 Supporting Commodore.

MI 313

FOG A.M.O. 37--The O Group of Ann Arbor (TOGA2), c/o Philip R. Yant, 3412 Oakwood, Ann Arbor, MI 48104. 313-764-4413 Supporting CP/M MS-DOS.

894-Southeastern Michigan Computer Org (SEMCO), P.O. Box 02426, Detroit, MI 48202. 313-284-2816 Supporting MS-DOS Commodore CP/M – Mac – Sinclai.

FOG A.M.O. 14--DEtroit FOG (DEFOG), c/o Evelyn & Julian Prince, 3452 Buckingham Trail, W. Bloomfield, MI 48033. 313-626-6641 Supporting CP/M MS-DOS.

MI 517

1000-Saginaw Valley Computer Associatio, c/o Lynn Kauer, P. O. Box 1604, Bay City, MI 48706. 517-781-2516 Supporting MS-DOS.

1062-Midland Commodore Computer Club (MCCC), c/o Rick Rosinski, 4702 Jefferson, Midland, MI 48640. 517-631-7162 Supporting Commodore.

MI 616

1001-Grand Rapids Apple Users' Group (GRApple), P. O. Box 1811, Grand Rapids, MI 49501. 616-866-1151 Supporting Apple //.

MN 218

FOG A.M.O. 118--Duluth Superior Ozzies (DSO), c/o Sanders J. Sweeney, 201 City Hall, Duluth, MN 55802. 218-626-3344 Supporting CP/M.

MN 612

FOG A.M.O. 111--Twin Cities Osborne Group (TCOG), P. O. Box 2163 Loop Station, Minneapolis, MN 55402. 612-871-6076 Supporting CP/M.

MO 314

862-St. Louis U G for the IBM PC, c/o Vicki Potter, P.O. Box 69099, St Louis, MO 63169-0099. 314-968-0992 Supporting MS-DOS.

FOG A.M.O. 55--Gateway CP/M Users Group (GatewayCP/M), P. O. Box 37022, St. Louis, MO 63141-1522. 314-831-8648 Supporting CP/M.

921-St. Louis Kaypro Users' Group (SLKUG), c/o Chuck Bogardus c/o Words To Go, 925 DeMun Ave., St. Louis, MO 63105. 314-721-7766 Supporting CP/M MS-DOS.

1002-Commodore Users of St. Louis (CUGSL), P. O. Box 28424, St. Louis, MO 63146-0984. Supporting Commodore.

MO 816

1034-Microcomputer Users Group (MUG), c/o Carl Mutch, P. O. Box 411436, Kansas City, MO 64141-1436. 816-587-8820 Supporting CP/M MS-DOS.

FOG A.M.O. 97--Mizouri Osborne Group (MIZOG), c/o Floyd Bartley, 7400 Hadley, Overland Park, KS 66204. 913-722-3349 Supporting CP/M MS-DOS.

MS 601

FOG A.M.O. 58--Mississippi Computer Society (MCS), P. O. Box 16417, Jackson, MS 39236-0417. 601-856-2509 Supporting CP/M MS-DOS TI99/4A.

MT 406

960-Butte Atari Computer Club (BACC), c/o Bob Headval, Butte, MT. 406-494-4729 Supporting Atari.

719-Rattlesnake Atari Computer Enthusi (RACE), c/o Skip Leininger, 2110 Strand, Missoula, MT 59801. 406-728-2414 Supporting Atari.

NC 704

FOG A.M.O. 71--Local Osborne Group Including CP/M (LOGIC), c/o Don Williams, 2000 First Citizens Bank Plaza, Charlotte, NC 28202. 704-331-1549 Supporting CP/M.

223-Charlotte Atari-Users Group (CAUG), c/o CCUG, P.O. Box 26721, Charlotte, NC 28221. 704-366-4320 Supporting Atari.

930-Charlotte Commodore Users Group (CCUG), P. O. Box 220189, Charlotte, NC 28222. 704-739-9295 Supporting Commodore.

NC 919

1035-Triangle Computer Society (TCS), P. O. Box 3588, Chapel Hill, NC 27515-3588. 919-968-4292 Supporting all systems.

FOG A.M.O. 107--Triad Region O Group Including CP/ (TROGIC), c/o Bill Morgan, 520 Merry Brook Court, Clemmons, NC 27012. 919-766-5530 Supporting CP/M.

865-Fayetteville Macintosh User's Grou (FMUG), P.O. Box 42224, Fayetteville, NC 28302. 919-484-1424 Supporting Macintosh.

888-Raleigh Area Group Epson (RAGE), c/o Julie Sauvageot, 103 York Court, Garner, NC 27529. 919-772-8683 Supporting Epson.

382-Triangle Adam Users (TAU), c/o Paul Pappas, 2623-A Yanceyville Street, Greensboro, NC 27405-4407. 919-375-6159 Supporting Adam.

864-Greensboro 80 Microcomputer Societ (GEMS), P.O. Box 10014, Greensboro, NC 27404. 919-454-1580 Supporting MS-DOS Tandy CP/M Commodore.

135-Triangle DataBase Users Group, c/o Dr. Richard W. Slatta, 3304 Dell Drive, Raleigh, NC 27609-7118. 919-781-3181 Supporting dBASEII.

866-Research Triangle User's Group (RTUG), c/o Mike Stroud, 2213 Winiger Drive, Raleigh, NC 27603. 919-772-4112 Supporting MS-DOS.

867-Amiga User's Group of the Raleigh (AURA), c/o Paul O'Keefe, 2213 Wininger Drive, Raleigh, NC 27603. 919-772-4112 Supporting Amiga.

ND 701

FOG A.M.O. 117--Osborne/Kaypro User's Group (O/KUG), P. O. Box 1372, Fargo, ND 58107. 218-222-1522 Supporting CP/M MS-DOS.

482-Minn. and Dakota Home Users Group (MAD HUG), c/o Dennis Schjeldahl, 509 Reeves Drive, Grand Forks, ND 58201. 701-772-6180 Supporting TI99/4A.

NE 402

637-Omaha Heath/Zenith User Group (OMAHUG), P. O. Box 777, Bellevue, NE 68005. 402-391-2071 Supporting Heath/Zenith.

FOG A.M.O. 39--Lincoln Local O Group (Lincoln LOG), c/o Wade Satterfield, 139 North 11th, #704, Lincoln, NE 68508. 402-488-6551 Supporting CP/M MS-DOS.

383-Amiga Users of the HEARTLANDS (AUoH), P. O. Box 1432 DTS, Omaha, NE 68101-1432. 402-571-2545 Supporting Amiga.

NH 603

730-Ms.Dos Users Group, c/o Fred Schulz, P. O. Box 153, Barrington, NH 03824. 603-664-7638 Supporting MS-DOS.

NJ 201

989-New Jersey PC Users Group (NJPC), c/o Neil Stewart, 320 Magnolia Avenue, Hillsdale, NJ 07642. 201-664-3311 Supporting MS-DOS.

940-International IBM User Group, c/o David Habler, 112 Old Bridge Road, Matawan, NJ 07747. Supporting MS-DOS.

915-Jersey Amiga Users Group (JAUG), c/o Eric Lavitsky, P.O. Box 1986, New Brunswick, NJ 08901. 201-563-9056 Supporting Amiga.

763-Shore Heath Users Group (SHUG), 1013 Highway #35, Ocean, NJ 07712. 201-775-1231 Supporting Heath Zenith CP/M MS-DOS.

941-C. R. H. S. Computer Club, c/o Mr. Goodman, Route 516, Old Bridge, NJ 08857. Supporting Apple Commodore MS-DOS.

1081-Amateur Computer Group - New Jerse, c/o Richard Drigger, 47 Conestoga Turnpike, Sparta, NJ 07871. 201-729-9409 Supporting MS-DOS.

1036-Union County MS-DOS Users Group, c/o David Clark, P. O. Box 925, Springfield, NJ 07081. 201-564-8999 Supporting MS-DOS.

386-Garden State Commodore User Grp In, 89 Stratford Road, Tinton Falls, NJ 07724. 201-542-2113 Supporting Commodore.

625-Enjoyers in New Jersey of Amigas (ENJA), c/o John Norman, P. O. Box 2314, West Patterson, NJ 07424. Supporting Amiga.

FOG A.M.O. 138--Jersey Osborne Group (JOG), P. O. Box 464, Westfield, NJ 07091-0464. 201-233-0202 Supporting CP/M MS-DOS.

NJ 609

1037-PC Club of South Jersey, P. O. Box 427, Cherry Hill, NJ 08003. 609-751-0050 Supporting MS-DOS.

871-South Jersey Atari Computer Enthus (SJACE), c/o James G. Boyd, P.O. Box 234, Cookstown, NJ 08511-0234. Supporting Atari.

387-Central Garden State Computer Club (CGSCC), c/o John E. Van Sant, Dorchester Arms 7-A, Cranbury, NJ 08512. 609-890-9337 Supporting TI99/4A Geneve.

969-Fort Dix PC Users Group, c/o Jose Lebron, P. O. Box 233, Fort Dix, NJ 08640. 609-562-4157 Supporting MS-DOS.

966-Princeton Apple][Users Group (PAUG), P. O. Box 268, Hopewell, NJ 08525. 609-587-8334 Supporting Apple][.

736-South Jersey IBM PC Users Group In (SJ IBM PCUG), P. O. Box 1117, Ocean City, NJ 08226-1117. 609-345-4712 Supporting MS-DOS.

NM 505

FOG A.M.O. 127--Albuquerque Osborne Group (AOG), c/o Mokler Associates, 7800 Phoenix N.E., Suite E, Albuquerque, NM 87110. 505-822-9607 Supporting CP/M MS-DOS.

NV 702

FOG A.M.O. 25--Vegas Osborne Group (VOG). Supporting CP/M.

473-Timex/Sinclair User Gp of Las Vega, 1003 East Bonanza Road, Las Vegas, NV 89101. 702-386-3054 Supporting Timex/Sinclair.

1053-Computerized Radio Amateur Prog Ex (CRAPE), c/o Harry Kebel KB0ZP, P. O. Box 2010, Sparks, NV 89432. Supporting MS-DOS.

NY 212

698-Bronx-64 Users Group (BUG-64), c/o Bruce Roberts, P. O. Box 523, Bronx, NY 10475. Supporting Commodore.

FOG A.M.O. 135--New York Osborne Users' Group (NYOUG), P. O. Box 20435, Midtown Station, New York, NY 10129. 212-765-6324 Supporting CP/M.

215-Metropolitan Life Commodore UserSI, P.O. Box 1543 Murray Hill Station, New York, NY 10156. Supporting Commodore (Met Life employees only).

470-New York Personal Computer Inc. (NYPC), 80 Wall Street, Suite 614, New York, NY 10005. 212-533-6972 Supporting MS-DOS.

893-Apricot Preserve, c/o Al Thibideau, 100 LaSalle Street #17a, New York, NY 10027. 212-666-2749 Supporting Apricot.

981-Creative Computing Club, 153 East 57th Street #8G, New York, NY 10022. 212-888-3953 Supporting CP/M MS-DOS novices.

NY 315

872-MS-DOS User's Group, c/o Nick Dudish, 109 West Rand Street, Ilion, NY 13357. 315-894-2134 Supporting MS-DOS.

FOG A.M.O. 82--Syracuse Osborne User's grouP (SOUP), c/o Gobind Singh Khalsa, 8371 Redwing Drive, Liverpool, NY 13090. 315-622-9209 Supporting CP/M.

472-Atari Comp Enthusiasts of Syracuse (ACE of Syracuse), c/o Fred T. Dunaway, 126-1/2 Old Liverpool Road, Liverpool, NY 13088. 315-451-2403 Supporting Atari.

449-Central New York Commodore Users G (CNYCUG), c/o Sid Chong, 6887 Peck Road, Syracuse, NY 13209. 315-638-2378 Supporting Commodore VIC20 Amiga MS-DOS.

NY 518

1072-Greater Plattsburgh Commodore U. G (GPCUG), 24 Lakeshore Drive, Plattsburgh, NY 12991. 518-561-7869 Supporting Commodore.

957-Mixed Burnt Hills Apple Group (Mixed BHAG), c/o Peter J. Terzian, 141 Seeley Street, Scotia, NY 12302. 518-399-5751 Supporting Apple.

NY 716

FOG A.M.O. 129--NIAgara FRontier Osborne Group (NIAFROG), c/o Robert W. Spencer, 238 Sterling Avenue, Buffalo, NY 14216. 716-838-6893 Supporting CP/M MS-DOS.

FOG A.M.O. 132--First Rochester Osborne Group (FROG), 350 Chili Avenue, Rochester, NY 14611. 716-232-7272 Supporting CP/M MS-DOS.

395-Atari Computer Owners of Rochester (ACORN), c/o Kathy Scoville, P. O.Box 23676, Rochester, NY 14692. 716-334-5820 Supporting Atari.

NY 718

1038-Queens Commodore Users Group (QCUG), c/o Bruce Behrend, 75-11 64th Street, Glendale, NY 11385. 718-386-8412 Supporting Amiga Commodore.

873-Apple/IBM User's Group, c/o Greg Trobaugh, 39-44 24th Street, Long Island City, NY 11101. 718-482-0088 Supporting Apple/IBM.

922-LICA/Amiga Users Group, c/o Mike Sasto, 91-19 85th Ave., Woodhaven, NY 11421. Supporting Amiga.

NY 914

FOG A.M.O. 104--Westchester Osborne Group (WOG), c/o Alfred Stamm, 33 Stratton Road, Scarsdale, NY 10583. 914-725-1098 Supporting CP/M C-128 MS-DOS.

874-County of Rockland Apple Branch (CRAB), P.O. Box 268, West Nyack, NY 10994. 914-353-3252 Supporting Apple.

1061-Westchester Kaypro Users Group (WESKUG), c/o George Bollenbacher, White Plains, NY. 914-631-3383 Supporting CP/M MS-DOS.

OH 216

FOG A.M.O. 44--AKCAN Osborne Users Group (AKCAN), c/o Terry Slingluff, 705 2nd Street NE, Canton, OH 44704. 216-454-3229 Supporting CP/M MS-DOS.

FOG A.M.O. 75--Cleveland Osborne Group (COG), c/o Peter S. Tippett, 2135 Renrock, Cleveland Heights, OH 44118. 216-888-2078 Supporting CP/M MS-DOS.

290-The Northcoast 99ers, 19809 Gladstone Road, Cleveland, OH 44122. 216-286-3179 Supporting TI99/4A.

Users Groups

400-Cleveland Sinclair Users Group, c/o Thomas Simon, 615 School Avenue, Cuyahoga Falls, OH 44221. Supporting Sinclair.

717-TI Chips Users Group, c/o John Parken, 4172 West 217, Fairview Park, OH 44126. 216-331-2830 Supporting TI99/4A.

988-The Atari Peekers of Lakewood (TAP), c/o Jim Haynes, 1689 Bunts Ave, Lakewood, OH 44107. Supporting Atari.

1039-Lake-Ashtabula IBM PC Users Group, P. O. Box 175, Madison, OH 44057-0175. Supporting MS-DOS.

399-Basic Bits Commodore Group, P.O. Box 447, No Ridgeville, OH 44039. 216-327-6853 Supporting Commodore.

696-Canton/Akron/Massillon Users Group (CAMUG), P. O. Box 2423, North Canton, OH 44720. 216-499-7771 Supporting Commodore.

FOG A.M.O. 9--Oberlin Osborne /Ob/Os (/Ob/Os), c/o Art Ripley, Box 5A OCMR, Oberlin, OH 44074. 216-775-8706 Supporting CP/M MS-DOS.

1040-Akron Sanyo/MS-DOS Club, c/o Bruce Creager, 5425 Diana Lynn Drive, Stow, OH 44224. 216-655-2371 Supporting MS-DOS Sanyo.

1075-Penn Ohio Users Group, 71 Elm Street, Struthers, OH 44471. Supporting TI 99/4A.

635-TRUMCUG (Commodore 64/128) (TRUMCUG), c/o Bob Summers, P. O. Box 8632, Warren, OH 44484. Supporting Commodore.

OH 419

1067-Hancock Users Group (HUG), c/o Nicholas A. Vradelis, P. O. Box 1651, Findlay, OH 45839-1651. Supporting Amiga Commodore.

875-Toledo Area Tandy Special Interest (TATSIG), c/o A.F. Morel, 1632 S. Wheeling Street, Oregon, OH 43616. 419-856-3721 Supporting Tandy.

OH 512

1013-Commodore Comp. Club of Cincinnati (CCCC), P. O. Box 152, Camp Dennison, OH 45211. 512-271-7215 Supporting Commodore.

OH 513

FOG A.M.O. 27--Cincinnati Osborne Group (COG), c/o Terradise Computer Systems, 6404 Coffey Street, Cincinnati, OH 45230. 513-232-4076 Supporting CP/M MS-DOS.

FOG A.M.O. 79--Dayton Osborne Users Group (DOUG), c/o Dayton Pro Photo, Box 534, Dayton, OH 45419. 513-293-9061 Supporting CP/M MS-DOS.

401-Dayton Microcomputer Assoc, Inc, c/o Dayton Museum of Natural Histo, 2629 Ridge Avenue, Dayton, OH 45414-5499. 513-252-1230 Supporting all systems.

990-Dayton MSDos Users Group (DMUG), 300 Pascal Drive, Fairborn, OH 45324-2618. Supporting MS-DOS.

1043-Miami Valley Atari Comp Enthusiast (MV ACE), c/o Tom Curtner, P. O. Box 24221, Huber Heights, OH 45424. 513-837-3628 Supporting Atari.

1041-Wildside Electronic Users Group, c/o Gary Niederhelman, P. O. Box 5227, Mt. Orab, OH 45154. 513-444-3070 Supporting all systems.

632-Cincinnati-Dayton TI-99 Users Grou (CinDay), c/o Rick Kellogg, 416 Pinewood Avenue, Piqua, OH 45356-2622. 513-773-5941 Supporting TI-99/4A.

1042-Compunet Computer Club, c/o Tina Braun, 16 Mohican Cove West, Sardinia, OH 45171. 513-446-3360 Supporting MS-DOS.

OH 614

720-SE Ohio Computer Society (SOCS), c/o Wayne Orwig, P. O. Box 1120, Cambridge, OH 43725. 614-432-7123 Supporting all systems.

OK 405

997-Duncan Area Commodore Computer Use (DACCU), c/o J. M. Dowlen, Rt 5 Box 44-Z, Duncan, OK 73533. 405-255-7410 Supporting Commodore.

FOG A.M.O. 67--OKlahoma City Personal Computers (OKCPC), c/o William S. Cooter, 1809 Vanessa Drive, Norman, OK 73071. 405-360-2141 Supporting CP/M MS-DOS.

751-Central OK Computer Organization (COCO), c/o Thomas Mangham, 3913 South Mable, Oklahoma City, OK 73129. Supporting COCO.

821-Oklahima Amiga Computer Enthusiast (OACES), P. O. Box 760533, Oklahoma City, OK 73176. Supporting Amiga.

1004-Sooner 99'ers, c/o Garth Potts, 12513 Hickory Hollow Drive, Oklahoma City, OK. 405-949-0111 Supporting TI 99/4A Geneve.

OK 918

FOG A.M.O. 51--Osborne Users of Tulsa (OUT), c/o James R. Roop, 1632 S. Denver, Tulsa, OK 74119-4233. 918-587-3918 Supporting CP/M.

OR 503

FOG A.M.O. 128--Lane Osborne CP/M Users Group (LOCUG), c/o. 503-747-8242 Supporting CP/M.

FOG A.M.O. 57--Portland Micro Computer Society (PMS), c/o Educational Research Associate, 333 SW Park Avenue 4th Floor, Portland, OR 97205-3784. 503-228-6345 Supporting CP/M.

980-Northwest Sanyo Enthusiasts (NWSE), P. O. Box 66173, Portland, OR 97266. Supporting Sanyo MS-DOS.

1020-Portland Area Users Group (PAUG), c/o Jon Rose, 5151 SW Barnes Road, Portland, OR 97221. 503-223-6915 Supporting Tandy.

1079-Portland Mac Users Group (PMUG), P. O. Box 8895, Portland, OR 97207. 503-254-2111 Supporting Macintosh.

PA 215

556-SNUG Philadelphia, c/o Bill Serody, 1181 Cumberland Road, Abington, PA 19001. 215-887-0513 Supporting Sanyo.

796-Delaware Valley Apple Branch (DVAB), c/o Gary S. Baron, P. O. Box 30, Bryn Mawr, PA 19010. 215-687-3202 Supporting Apple.

FOG A.M.O. 121--Philadelphia Region O Group (PhROG), P. O. Box 1144, Paoli, PA 19301. 215-648-5862 Supporting CP/M MS-DOS.

1078-Philadelphia Area Computer Society (PACS), c/o La Salle University, 20th & Olney Avenue, Philadelphia, PA 19141. 215-951-1255 Supporting all systems.

PA 412

993-Butler Commodore Users Group (BCUG), c/o Jeffry Long, P. O. Box 2408, Butler, PA 16003-2408. 412-285-8305 Supporting Commodore Amiga Vic20.

994-Personal Computer - Butler Users G (PCBUG), c/o Jeffry Long, P. O. Box 1041, Butler, PA 16003-1041. 412-285-8305 Supporting MS-DOS.

FOG A.M.O. 50--Three Rivers Osborne Group (TROG, PA), P. O. Box 23152, 4th Ave. Station, Pittsburgh, PA 15222. 412-661-2446 Supporting CP/M MS-DOS.

630-Pittsburgh Area Computer Club (PACC), P. O. Box 6440, Pittsburgh, PA 15212. 412-367-7549 Supporting all systems.

1057-Pittsburgh User's Group, c/o Gary Taylor, P. O. Box 8043, Pittsburgh, PA 15216. 412-341-6874 Supporting TI 99/4A.

PA 717

878-Eight Squared: Central PA Commodor (82), P.O. Box 249, Camp Hill, PA 17011. 717-763-4423 Supporting Commodore.

235-All Peoples Personal Comp Order Ma (APPCOM), RD1 Box 83-1/2, Dornsife, PA 17823. 717-758-3396 Supporting Commodore.

618-Harrisburg PC User Group, c/o Jack Stahl, 1195 Fairmont Drive, Harrisburg, PA 17112. 717-652-9097 Supporting MS-DOS.

FOG A.M.O. 74--Lancaster Micro-Users Group (L-MUG), c/o Allen H. Eshleman, 3624 Horizon Drive, Lancaster, PA 17601. 717-285-4940 Supporting CP/M MS-DOS.

FOG A.M.O. 92--Mid-Pennsylvania Osborne Group (MidPOG), P. O. Box 287, Lemoyne, PA 17043. 717-763-7064 Supporting CP/M MS-DOS.

PA 814

1021-Spectrum Atari Group of Erie (SAGE), P. O. Box 10562, Erie, PA 16514-0562. 814-825-4790 Supporting Atari.

1048-Computer Users of Erie (CUE), c/o Mike Daly, P. O. Box 1975, Erie, PA 16507-0975. Supporting CoCo MS-DOS.

240-Nittany Users of Texas Instruments (NUTI), 625 Wiltshire Drive, State College, PA 16803. 814-238-0396 Supporting TI99/4A MYARC Geneve.

SC 803

798-Amiga Charleston Users Group, P. O. Box 10543, Charleston, SC 29411-0543. 803-795-6590 Supporting Amiga.

1049-Commodore Computer Club of Columbi (CCCC), c/o Buster White, 318 Quincannon, Columbia, SC 29212. 803-772-0305 Supporting Commodore.

975-Rock Hill Atari Computer Enthusias (RHACE), c/o Casey Munn, 220 Peachtree Road Rt. 6, Rock Hill, SC 29730. 803-329-4546 Supporting Atari 8 & 16 bit systems.

408-Spartanburg Commodore Users Group (SPARCUG), P. O. Box 319, Spartanburg, SC 29322. 803-592-1149 Supporting Commodore Amiga MS-DOS.

SD 605

467-Siouxland 99ers, 4604 Bluestem Circle, Sioux Falls, SD 57106. Supporting TI99/4A.

880-Apple Core of Siouxland, c/o William J. Reynolds, P.O. Box 90002, Sioux Falls, SD 57105. 605-334-4391 Supporting Macintosh Apple.

TN 615

1022-Commodore Association of SouthEast (CASE), c/o Tom Kujawa, P. O. Box 2745, Clarksville, TN 37042-2745. 615-648-1838 Supporting Amiga Commodore.

799-Cumberland Microcomputer Users Grp (CMUG), c/o Dean Carothers, TTU, P. O. Box 5105, Cookeville, TN 38505. 615-372-3305 Supporting all systems.

737-East Tennessee PC User Group (ETPCUG), c/o Jim Calloway, 637 Woodlawn Pike, Knoxville, TN 37920. 615-577-0935 Supporting MS-DOS.

FOG A.M.O. 119--Nashville CP/M Users Group (NCP/MUG), P. O. Box 24606, Nashville, TN 37202-4606. 615-361-4210 Supporting CP/M.

608-Nashville Commodore Users Group, c/o Carl Manka, P. O. Box 121282, Nashville, TN 37212. 615-889-8749 Supporting Commodore MS-DOS.

FOG A.M.O. 13--Smoky Mountain Osborne Group (SMOG), P. O. Box 171, Oak Ridge, TN 37831-0171. 615-483-6857 Supporting CP/M.

TN 901

410-Mid-South TI-99/4A Users Group, P. O. Box 38522, Germantown, TN 38183-0522. 901-358-0667 Supporting TI99/4A.

FOG A.M.O. 15--Memphis Osborne Group (MOG), c/o Isaac L. Kullman, 2753 Woodland Hills Cove, Memphis, TN 38127. 901-358-8128 Supporting CP/M MS-DOS.

474-Memphis PC Users Group, P. O. Box 241756, Memphis, TN 38124-1756. 901-685-5521 Supporting MS-DOS.

814-Memphis-East Commodore Organizatio (MECO), c/o Dwight Campbell, 6870 Sauterne Cove, Memphis, TN 38115. 901-362-6929 Supporting Commodore.

TX 214

1024-Fort Worth Timex/Sinclair Users Gr, c/o David Baulch, 4424 Geddes Avenue, Ft. Worth, TX 76107. Supporting Timex Sinclair.

1023-Dallas Timex/Sinclar/Amstrad U.G. (S T/S/A UG), c/o George Edmonds, P. O. Box 153421, Irving, TX 75015. 214-252-5622 Supporting Timex Sinclair Amstrad.

TX 409

FOG A.M.O. 41--Local Osborne Group (LOG), c/o Gary Teaney, 2680 Long, Beaumont, TX 77702. 409-832-8369 Supporting CP/M.

1032-Golden Triangle PC Club (GTPCC), c/o Jack Vaughn, 3695 Bryan Drive, Beaumont, TX 77707-2424. 409-832-8396 Supporting MS-DOS.

FOG A.M.O. 43--AGGi Non-profit Osborne Group (AGGNOG), c/o Douglas J. Barker, 2807 Wildflower, #4, Bryan, TX 77802. 409-774-7176 Supporting CP/M MS-DOS.

TX 512

FOG A.M.O. 7--A E I O U (AEIOU), c/o Jim Dunn, 4506 Cumbria Lane, Austin, TX 78727. 512-836-3010 Supporting CP/M MS-DOS.

FOG A.M.O. 18--South Texas Osborne Group (STOG), c/o Banjo Distributing Co., 602 Moorside Drive, San Antonio, TX 78239. 512-654-0241 Supporting CP/M MS-DOS.

978-Atari Hard Disk User Group (HDUG), c/o Network: Atari, 5831 Sun Bay, San Antonio, TX 78244. 512-662-9764 Supporting Atari.

1025-San Antonio Heath Users Group (SAHUG), 7111 Blanco Road, San Antonio, TX 78216. Supporting Heath.

1080-Alamo PC Organization, c/o Frank Snyder, 6410 Fox Glen, San Antonia, TX 78247. 512-654-1877 Supporting MS-DOS.

TX 713

1063-Bay Area GS User's Group, c/o Michael Sayer, P. O. Box 630, Channelview, TX 77530. Supporting Apple //GS.

FOG A.M.O. 76--Osborne Users Club, Houston (OUCH), c/o Bruce Wilson, 10510 Tradewinds, Houston, TX 77086. 713-931-1096 Supporting CP/M.

892-Houston Area League of PC Users (HAL PC), P. O. Box 61266, Houston, TX 77208. 713-447-3800 Supporting MS-DOS.

1054-Computers Are For Everyone, c/o Bill Barnhart, Houston, TX. 713-350-3179 Supporting Atari.

417-Commodore Houston Users Group (CHUG), P. O. Box 612, Tomball, TX 77375. 713-995-5449 Supporting Amiga Commodore.

FOG A.M.O. 108--CLOG (CLOG), P. O. Box 57613, Webster, TX 77598. Supporting CP/M MS-DOS.

TX 806

FOG A.M.O. 28--Panhandle Osborne Group (POG), c/o Robert O. McNeil, 3028 N.E. 26th, Amarillo, TX 79107. 806-355-7509 Supporting CP/M.

983-Amarillo 99'ers Users Group (AUG), c/o Samuel R. M. Burton, P. O. Box 8421, Amarillo, TX 79114. 806-352-4778 Supporting TI99/4A Geneve.

FOG A.M.O. 134--Lubbock Osborne Group (LOG), c/o John Krahmer, 4901 77th Street, Lubbock, TX 79424. 806-742-3920 Supporting CP/M MS-DOS.

TX 817

1050-West Side Atari Club, c/o Mike Kelley, 1766 Belshire Court, Ft. Worth, TX 76140. 817-293-8229 Supporting Atari.

742-Heart of Texas Modem User's Group (HOTMUG), c/o Tom Kilbride, P. O. Box

Users Groups

8814, Waco, TX 76714-8814. Supporting remote systems, telecommunications.

UT 801

FOG A.M.O. 105--Salt Lake Metropolitan O Group (SMOG), c/o William Adams, 760 - 3 Fountains Drive #106, Murray, UT 84107. 801-526-2280 Supporting CP/M MS-DOS.

733-Payson Area Commodore User Group (PAC), P. O. Box 525, Salem, UT 84653. Supporting Commodore.

VA 703

920-Capital Area Timex/SinclairUsersGr (C.A.T.S.), c/o Vernon Smith, P.O. Box 467, Fairfax Station, VA 22039. 703-978-1835 Supporting Timex/Sinclair.

575-Northern Virginia Apple Users Grou (NOVAPPLE), c/o Dave Harvey, P. O. Box 8211, Falls Church, VA 22041. 301-899-4005 Supporting AppleII Macintosh.

VA 804

551-Apple Users Group International (ATGI), c/o H. Joseph Dobrowolski, P. O. Box 913, Langley AFB, VA 23665. 804-865-7520 Supporting Apple/// Macintosh Apple][.

935-Portsmouth Commodore Users Group (PCUG), P. O. Box 6561, Portsmouth, VA 23703. 804-393-4799 Supporting Commodore.

FOG A.M.O. 52--Central Virgina O G (CVOG), c/o Theodore B. Smith, 9206 Mapleway Road, Richmond, VA 23229. 804-740-5718 Supporting CP/M MS-DOS.

619-Richmond Kaypro Users Group (RKUG), c/o Wayne Anderson, P. O. Box 3892, Richmond, VA 23235. 804-744-6464 Supporting Kaypro CP/M MS-DOS.

FOG A.M.O. 78--Tidewater Osborne Group (TOG), c/o William B. Stilley, P.O. Box 68068, Virginia Beach, VA 23455. 804-497-5556 Supporting CP/M MS-DOS.

934-Southside Tidewater Atari Technica (STATUS), 5425 Shenstone Circle, Virginia Beach, VA 23455. 804-464-2100 Supporting Atari 8 & 16-bit.

VI 809

FOG A.M.O. 70--St. Croix Osborne Users Group (ST. COUG), c/o Photo-Ready Printing Inc., P. O. Box 2610 - Christiansted, St. Croix, VI 00820. 809-778-6651 Supporting CP/M.

WA 206

597-Kitsap Country Atari Comp Entusias (KC-ACE), c/o Kitsap County ATARI Enthusiast, POB 2333, Bremerton, WA 98310. 206-373-4840 Supporting Atari 8 bit and ST's.

FOG A.M.O. 99--South King county Operators Group (SKOG), c/o Carl B. Tenning, 316 S. 193rd, Seattle, WA 98148. 206-824-3843 Supporting CP/M MS-DOS.

FOG A.M.O. 112--Osborne Executive User's Group (OEUG), P. O. Box 12214, Seattle, WA 98102. 206-232-2763 Supporting CP/M CPM+.

1108-Seattle Osborne Users Group (SOUG), c/o Tim Mayhew, 1061 East Republican Street, #4, Seattle, WA 98102-5058. 206-323-4153 Supporting Osborne.

1026-North Star Computer Society (NCSC), c/o Neil Smith, P. O. Box 311, Seattle, WA 98111. 206-525-9487 Supporting North Star CP/M Dimension S100.

FOG A.M.O. 72--Tacoma Open Group for microcompute (TOG), c/o Robert J. Thomson, 1808 Lenore Drive, Tacoma, WA 98406. 206-752-5582 Supporting CP/M MS-DOS.

890-Tacoma Area PC Users Group (TAPCUG), c/o Lew Chichester, 2811 Bridgeport Way West #24, Tacoma, WA 98466. 206-565-4917 Supporting MS-DOS.

265-Vashon Island Sinclair-Timex Assoc (VISTA), c/o Tony Willing, P.O. Box 199, Vashon Island, WA 98070. Supporting Timex Sinclair.

WA 509

FOG A.M.O. 123--Spokane Microcomputer Users Group (SMUG), c/o Rings & Things, P. O. Box 1753, Spokane, WA 99210-1753. 509-922-1346 Supporting CP/M MS-DOS Amiga CP/M Heath Kaypro.

FOG A.M.O. 19--Three Rivers Osborne Group (WA) (TROG, WA.), c/o Allen B. Webb, 743 North 61st Avenue, West Richland, WA 99352. 509-967-2430 Supporting CP/M.

WI 414

FOG A.M.O. 22--Combined Microcomputer Owners Soc. (C.M.O.S.), c/o S87, W31292 Meyer Drive, Mukwonago, WI 53149. 414-782-4377 Supporting CP/M MS-DOS.

WI 608

427-Commodore Amiga Madison & Environs (CAMEO), Box 53, Union South, 227 N Randall, Madison, WI 53706. 608-233-7445 Supporting Amiga.

WI 715

936-Price County Computer Users Group (PCCUG), c/o Joseph A. Huycke, Route 2, Box 532, Phillips, WI 54555. 715-332-5277 Supporting Commodore Apple MS-DOS.

1065-715 Users Group, c/o Brian Drost, 1052 South Fork Drive, River Falls, WI 54022. Supporting Commodore.

WV 304

FOG A.M.O. 59--Kanawha Valley FOG (Valley FOG), c/o Merritt Corp., P.O. Box 668, Charleston, WV 25323-0668. 304-344-3638 Supporting CP/M MS-DOS.

709-Personal Computer -- Huntington U (PC-HUG), c/o Levi Lauvray, P. O. Box 2173, Huntington, WV 25722-2173. 304-526-5189 Supporting all systems.

946-Beckley Area Youth Museum Users Gr (BAYMUG), c/o Robert Painter, Route 1, Box 116, Mt. Hope, WV 25880. 304-877-6740 Supporting MS-DOS Tandy Commodore COCO Apple.

1028-Ohio Valley Association of Compute, c/o Bill Davis, 1142 Courtlland Road, Weirton, WV 26062. 304-797-8321 Supporting all systems.

WY 307

824-Big Horn Basin Computer User's Grp, P. O. Box 2353, Cody, WY 82414. Supporting MS-DOS Atari Apple.

Canada

Alta403

FOG A.M.O. 94--Calgary Osborne Users Group (COUG), c/o Sidney Lee, #2 - 3135 41st Street S.W., Calgary, ALTA T3E 3K9, CANADA. 403-246-2030 Supporting CP/M MS-DOS.

FOG A.M.O. 45--Klondike Osborne Group (KOG), c/o Richard Guthrie, P.O. Box 4974 Stn PSSE, Edmonton, ALTA T6E 5G8, CANADA. 403-426-0819 Supporting CP/M MS-DOS.

1030-Edmonton Adam Users Group (EAUG), c/o Rick Forges, 14712-122 Street, Edmonton, ALTA T5X 1V9, CANADA. 403-457-4204 Supporting Coleco ADAM.

B.C.604

FOG A.M.O. 17--Vancouver Portable Computer Club (VPCC), P. O. Box 80621, Burnby, B.C. V5H 3Y1, CANADA. 604-271-1519 Supporting CP/M MS-DOS.

976-Chilliwack Commodore Computer Club, P. O.Box 413, Sardis, B.C. V2R 1A7, CANADA. Supporting Amiga Commodore.

Mani204

24-Muddy Waters User Group (MWUG), 55 Rowand Ave, Winnipeg, MAN R3K 2N6, CANADA. 204-832-3982 Supporting CP/M MS-DOS.

Ont.416

602-TI Users Group Toronto (9T9 UG), c/o Randy Rossetto, #109-2356 Gerrard Street East, Toronto, ONT. M4E 2E2, CANADA. 416-469-3468 Supporting TI99/4A.

FOG A.M.O. 120--Osborne/Kaypro User Club of Toront (O/KUCT), c/o Leslie F. Fontaine, 4 Munhall Road, Weston, ONT. M9P 1P9, CANADA. 416-247-8503 Supporting CP/M MS-DOS.

Ont.519

FOG A.M.O. 95--London Osborne Group (LOG), c/o Jack Lorimer, 1625 Hillside Drive, London, ONT. N6G 2R1, CANADA. Supporting CP/M MS-DOS.

Ont.613

652-Ottawa-Hull Timex/Sinclair User Gr, c/o Michael Dove, 2161 East Acres Road, Gloucester, ONT. K1J 9A6, CANADA. Supporting Timex/Sinclair.

911-Ottawa Apple II User's Group, c/o John C. Jackson, P.O. Box 2516, Station -D-, Ottawa, ON K1P 5W6, CANADA. Supporting Apple.

Ont.916

910-Sanyo Users in Toronto (SUIT), P.O. Box 6206, Station -A-, Toronto, ONTARIO M5W 1P6, CANADA. 416-967-1455 Supporting Sanyo & MS-DOS.

P.Q.514

FOG A.M.O. 73--Montreal O & CP/M Users Group (MICROCOZM), c/o Gerald Barry, Suite 2100, 1080 Beaver Hall Hill, Montreal, P.Q. H2Z 1S8, CANADA. 514-526-9940 Supporting CP/M MS-DOS.

897-Spectravideo and MSX User's Group (SMUG), c/o Frances Fontaine, 20 - 159th Avenue, N.D. Ile Perrot, P.Q. J7V 5V6, CANADA. 514-453-0477 Supporting Spectravideo MSX MS-DOS CP/M.

Australia

FOG A.M.O. 131--Victorian Osborne Users Group (VOUG), P. O. Box 169, Camberwell, VIC 3124, AUSTRALIA. (03) 459-8934 Supporting CP/M MS-DOS.

1029-Brisbane Users' Group for 16-bit (BRISBUG), P. O. Box 985, Toowong, QLD. 4066, AUSTRALIA. 831-8311 Supporting 16-bit & above systems.

France

FOG A.M.O. 110--Osborne Users FRANCE (OUF), c/o. 43-44-82-65 Supporting CP/M.

Greece

967-Cretan Apple User Group, c/o Michael Heretakis, 7 Palmeti Str., 71202 Heraclion, CRETE, GREECE. Supporting Apple.

Indonesia

739-Jakarta Computer Society (JCS), c/o James Filgo, Box R, APO San Francisco 96356-5000. 799-3286 Supporting MS-DOS.

Israel

FOG A.M.O. 33--Israel Osborne Users Group (IOUG), c/o. 0-523-4043 Supporting CP/M.

New Zealand

FOG A.M.O. 53--New Zealand Osborne Group (NZOG), c/o 8 Titoki Avenue, Mangere Bridge, Auckland, NEW ZEALAND. 887-135 Supporting CP/M.

FOG A.M.O. 109--Central Region Osborne Group (CROG), P. O. Box 6571, Te Aro, Wellington, NEW ZEALAND. 64 04 852555 Supporting CP/M MS-DOS.

South Africa

FOG A.M.O. 90--Johannesburg Osborne Group (JOG), Box 33360, Jeppestown 2043, SOUTH AFRICA. 011-51-6304 Supporting CP/M.

Thailand

45-Bangkok Computer Users Group (BUG), 123 Petchburi Road, Bangkok 10400, THAILAND. 585-0858 Supporting CP/M MS-DOS.

West Germany

FOG A.M.O. 36--Computer Club Deutschland (CCD), c/o Werner Dworak, Allewind 51, 7900 Ulm, WEST GERMANY. 07-304-3274 Supporting CP/M MS-DOS.

FOG A.M.O. 24--American German O G (AGOG), c/o Amccom, 4th Bde, APO, NY 09185-2216. 061-52-4210 Supporting CP/M MS-DOS.

FOG A.M.O. 103--Eifel Fog Users Group (EFOG), Box 686, APO NY 09132-5362. Supporting CP/M MS-DOS.

740-The Amiga Connection of Europe (ACE), c/o Scott Powers, 56th Aviation Company, APO NY 09024. 06206-79514 Supporting Amiga.

FOG A.M.O. 62--First Ramstein O G (FROG), c/o Wilburn Fant, Box 10179, APO New York, NY 09012. (0049) 6301-4150 Supporting CP/M MS-DOS.

Special Interest Groups

FOG A.M.O. 85--Microcomp. In Sup. Of Trans. (MIST), c/o Wycliffe Bible Translators, P.O. Box 188, Eastlake, CO 80614. 303-450-9608 Supporting CP/M.

FOG A.M.O. 96--ERC-Osborne Users Group (ERC-OUG), c/o A. W. Adkins Jr., 10418 44th Avenue, Beltsville, MD 20705. 301-937-7954 Supporting CP/M.

2-Public Remote Access Comp. Standar (PRACSA), P. O. Box 1204, San Jose, CA 94015. Supporting remote systems, telecommunications.

12-Dvorak Developments, P. O. Box 1895, Upland, CA 91785. Supporting Dvorak keyboard.

22-The C Users' Group, International (CUG), P. O. Box 97, McPherson, KS 67460. 316-241-1065 Supporting 'C'.

58-COMAL Special Interest Group, c/o Bob Bain, P. O. Box 2689, Silver Spring, MD 20902. 301-649-5964

101-MUMPS Users Group (MUG), 4321 Hartwick Road Suite 510, College Park, MD 20740. 301-779-6555 Supporting MUMPS.

124-dBase SIG, P. O. Box 3051, Daly City, CA 94015. 415-756-0821 Supporting dBASE.

337-TI PPC Notes, P. O. Box 1421, Largo, FL 34649-1421. Supporting TI-59, TI-74, TI-95.

684-Chameleon Users Group (CHUG), c/o Hal Van Aller, 1440 Foxwood Court, Annapolis, MD 21401. 301-757-8763 Supporting Seequ Chameleon.

909-National Visual Commuter Users Grp, c/o Patric Lee Howley, 454 Barcelona Drive, Satsuma, AL 36572. 205-675-9457 Supporting Visual.

938-ZCPR Users Group, c/o Echelon, P. O. Box 705001-800, South Lake Tahoe, CA 95705. 916-577-1105 Supporting ZCPR CP/M.

962-Computer-Using Educators (CUE), P. O. Box 2087, Menlo Park, CA 94026. 415-328-2248 Supporting computers in schools.

905-Amstrad User Group, USA, c/o Harley Ristad, 12741 Matteson Ave 3, Los Angeles, CA 90066. 213-397-7981 Supporting AmstradPCW.

1009-Meeting 64/128 Users Through Mail, c/o Jean Nance, R1, Box 151, St. Joseph, IL 61873. 217-469-2556 Supporting Commodore.

1015-Plus/4 Users Group, P. O. Box 1001, Monterey, CA 93942. Supporting Plus/4 C-16.

1059-Portable Computer News & Views, c/o Ted Lloyd, P. O. Box 247, Champlain, NY 12919.

1064-Software Theft Opposition Project (STOP), P. O. Box 3142, San Mateo, CA 94403. Supporting anti-piracy.

FOG International Computer Users Group (FOG), P. O. Box 3474, Daly City, CA 94015. Supporting MS-DOS and CP/M users with two monthly magazines, disk libraries, and techincal support hotlines.

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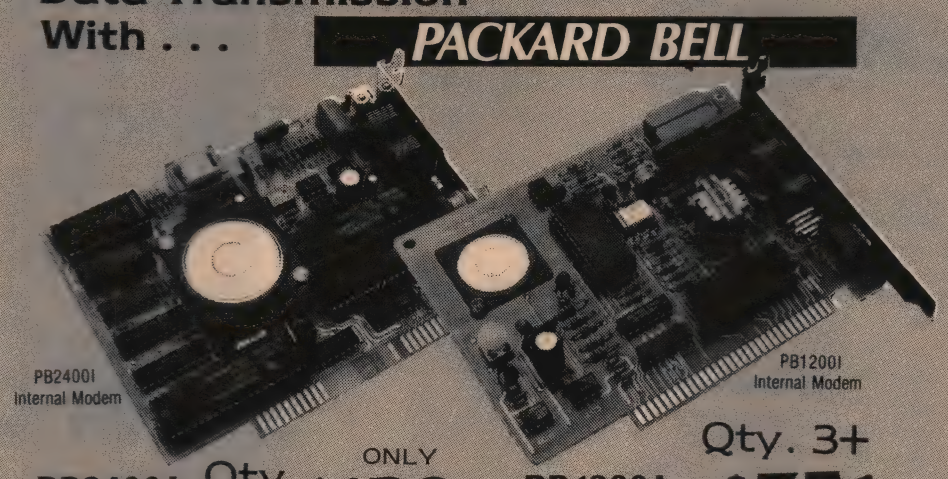

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- 2 year warranty

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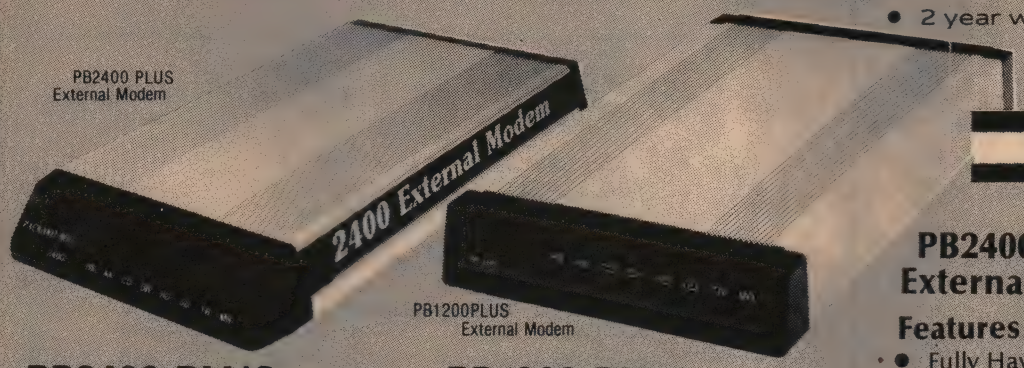
- 2 year warranty



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Dear Valued Customer,

Thank you for your continued confidence in our ability to be your best source for microcomputer printers. We at MidWest Micro know that we must continue to earn your loyalty with the best possible products and savings.

It is therefore with great delight that I offer you the new Seikosha SL-80AI. It offers you the versatility of 24 pin printing combined with a large print buffer and both Epson and IBM compatibility. To be able to offer this much printer to you for less than $329 makes me feel very good about our ability to earn your confidence and continuing support.

The value offered by the SL-80AI may cause some spot shortages, so call early and please excuse any delays in shipments that may occur. Our trained sales people are waiting to help you, so call today!

Sincerely,
Mark L. Runkle
President
MidWest Micro

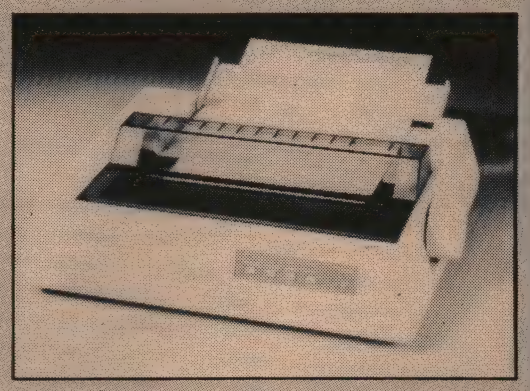
1987 Computer Peripherals Best Buy of the Year

MidWest Micro
Winner of Computer Shopper's Best Buy Award for Impact Printer

VERSATILITY, EXCELLENT PRINTING QUALITY, THE REAL 24-PIN PRINTER FOR LESS THAN $329 . . . SO HERE IT IS!

SEIKOSHA SL-80AI

24-Pin Dot Matrix Printer



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FEATURES:
- Fine letter quality printing by 24 pins
- Letter quality printing speed 54 cps
- 135 cps draft printing speed
- Featuring EPSON LQ® and IBM® mode (Optional with Epson LQ 800)
- Quiet even for executive office (as low as 52 dBA)
- Variety of printing styles – Double-Width, Bold, Double-Strike, Italic, Superscript/Subscript and Underlining
- 10 kinds of high resolution dot addressable graphic printing
- Automatic paper loading and ejection system
- Download character setting maximum 128 characters
- Switch margin setting by the front panel
- Built-in 16K buffer (Epson LQ 800 has only 7K)
- Optional Automatic Cut Sheet Feeder

SPECIFICATIONS

PRINTING
Printing Method: Impact Dot Matrix Method, Bi-directional (character printing) Uni-directional (graphic printing)
Print Head: 24 pins
Printing Speed: 54cps (LQ Elite), 45cps (LQ Pica)
Throughput: 53 lpm (Draft Pica)
Line Feed Pitch: 1/6, 1/8, 7/72, 7/60, n/60, n/72, n/180, n/216
Line Feed Speed: 6.7 lines/sec (6 lines/inch)
Character Sets: 185 characters and symbols, 49 international characters
Character Attributes: Double-width, Bold, Double-strike, Italic, Superscript/Subscript & Underlining
Acoustics: Below 52dBA (ISO/DIS 7779)

MEDIA HANDLING
Paper Weight: 15 to 20 lbs., (45 to 65 kg.)
Paper Width: 4 to 10 inches (fanfold and cut sheet)
Multipart Paper: Max original plus 2 sheets (total thickness 0.2 mm)

INTERFACING
Parallel: Centronics compatible
Buffer: 16K-byte buffer (2K-byte when download character is set)

INK RIBBON
Type: Special cassette type ribbon, Black #SP-80051
Life: 2.5 million characters

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Printers			
SP-180AI	100 CPS, Epson/IBM Compatible, Parallel Interface	$249	~~$149~~
SP-1000AP	100 CPS, Apple IIc/MAC Compatible	299	~~219~~
SP-1000VC	100 CPS, Commodore Compatible, Cable Included	270	~~159~~
SP-1200AI	120 CPS, Epson/IBM Compatible	319	~~189~~
SP-1200AS	120 CPS, Epson Compatible, Serial Interface	319	~~189~~
MP-1300AI	300 CPS, Epson/IBM Comp., Ser. & Par., Color Option	599	~~289~~
MP-5300AI	300 CPS, Epson/IBM Comp., Ser. & Par., 15" Carriage	799	~~439~~
SK-3000AI	300 CPS, Epson/IBM Comp., Ser. & Par., Color Option	649	~~369~~
SK-3005AI	300 CPS, Epson/IBM Comp., Ser. & Par., 15" Carriage	849	~~459~~
BP-5420AI	420 CPS, Epson/IBM Comp., Ser. & Par., 15" Carriage	1849	~~999~~
SL-80AI	24-Pin, 10" Carriage, Epson/IBM Compatible	549	~~329~~
SBP-10AI	800 CPS, Epson/IBM Comp., 64K, Par. & Ser.	4495	**$CALL$**
PRINTER ACCESSORIES			
	Cut Sheet Feeder (For SP Series & SL-80AI)	155	**99**
	MP-1300AI Color Kit	155	**119**
PRINTER RIBBONS			
	SP Series Cartridge	Low as	
	BP Series Cartridge	**$3.95** each	
	MP Series Cartridge - Black		
	MP-1300 Cartridge - Color		

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Friends:

The latest opportunity for you to increase your office productivity is with the complete line of Seikosha printers. Seikosha's are made with the same precision and durability you have come to expect from the quality leader in the watch industry – Seiko. Seikosha is also the sister company of the largest microcomputer printer manufacturer in the world – Epson. With this great Seikosha heritage and MidWest Micro's dedication to giving you quality equipment at the most competitive pricing, we offer you these three great business quality printers.

The MP5300AI with its fast 300 cps throughput will speed up almost any small to medium business operation. The BP-5420AI is a super high performance business application printer. It offers great speed at 420 cps, excellent quality output, and rear and bottom paper feed. The BP-5420AI compares across the board with the Epson 420I and even uses the same ribbon cartridge.

Finally, we offer you the best possible value in a high-speed business printer with a low-cost color option. The MP-1300AI is the sister-in-law to the Epson EX-800 but beats it hands down when compared feature for feature. For example, the MP-1300AI prints at 300 cps in draft pica while the EX-800 is only 250 cps, the MP-1300AI offers both rear and bottom paper path with the EX-800 being only rear, and the MP-1300AI gives you a 10K print buffer as opposed to the EX-800 with its 8K print buffer.

Seikosha outperforms the competition where it counts and even has a two full year warranty. Call MidWest today for the solution to your business printer needs.

Sincerely,
Mark L. Runkle
Mark L. Runkle
President

Reduce the processing time of a large volume of business data to an incredible minimum with. . .

SEIKOSHA MP-1300AI

Only **$299** Even Less

List $799

2 Full Year Warranty

- High Speed Printing (300 cps) with Minimum Noise
- Superb NLQ Printing (50 cps)
- 47 lpm Throughput (Draft)
- Variety of Characters and Graphics
- Both IBM and EPSON Compatible Printer Emulation Modes
- Built-in Parallel and Serial Interfaces
- Auto Paper Loading and Ejection
- Downloadable Character Settings
- Front Panel Margin Setting
- Built-in 10k Print Buffer
- Both Rear and Bottom Paper Path
- Easy-to-Handle 7 Color Printing Kit (optional)

SEIKOSHA MP-1300AI BEATS EPSON EX-800 Feature for Feature

- Seikosha has a 2 Full Year Warranty instead of Epson's 1 Year
- MP-1300AI prints at 300 cps in draft pica while EX-800 is only 250 cps
- MP-1300AI has both rear and bottom paper path while the EX-800 has only rear
- MP-1300AI gives you a 10k Buffer as opposed to an 8k on the EX-800

SEIKOSHA MP-1300AI COLOR KIT Lists $155 **ONLY $119**

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SEIKOSHA MP-5300AI

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- High Speed Printing, (200 cps) with Minimum Noise
- Superb NLQ Printing at 50 cps
- Variety of Characters and Graphics
- Both IBM and Epson Compatible Printer Emulation Modes
- Built-in Parallel and Serial Interfaces
- Built-in 6K Print Buffer
- Downloadable Character Sets
- Front Panel Margin Setting
- Both Rear and Bottom Paper Path

2 Full Year Warranty

Bring the true value of high speed performance to your office with . . .

SEIKOSHA BP-5420AI

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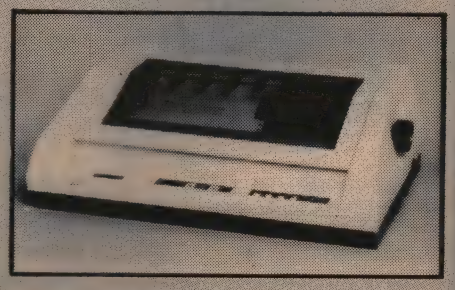

- 420 cps Maximum Print Speed
- High Quality Correspondence Printing at 104 cps
- IBM and EPSON Mode Selectable
- Built-in 18k Print Buffer
- Both Parallel and Serial Interfaces
- Pin Feed and Friction Feed Standard
- Handles Paper up to 15.5" Wide
- Eight Language Fonts with DIP Switch Selector
- Heavy-Duty Construction
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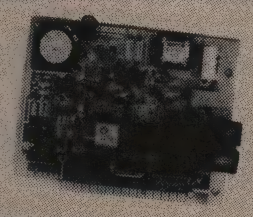

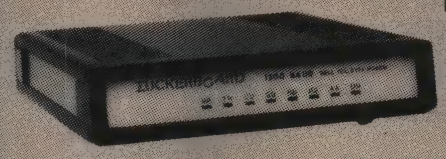

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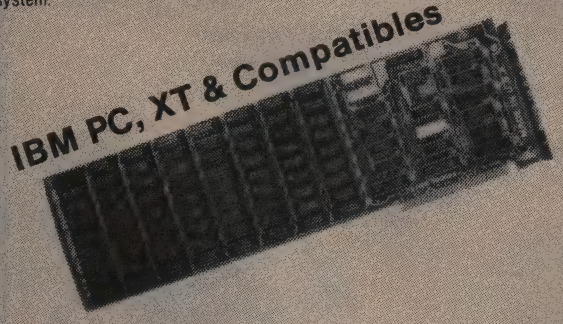

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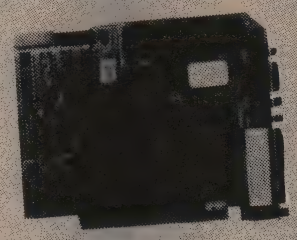

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Now you can display color graphics on your monitor and what-you-see-is-what-you-get. Zuckerboard's color graphics video card is designed for your IBM PC, XT, AT or compatible.

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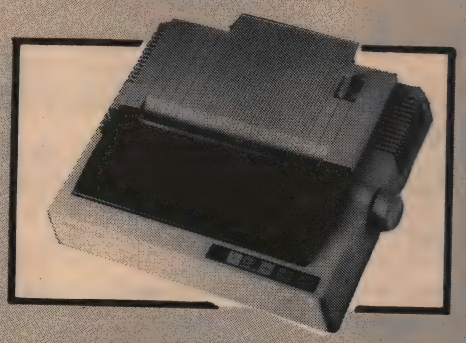

Just plug the Star NX-10C in and your text and graphics come out clear, clean and crisp. The NX-10C is fully Printshop compatible so you can do all the things like sign making and graphics that your Commodore computer specializes in. Easy front panel operation and the "no fuss" auto paper feed are enjoyable, time saving features on this high quality, affordable printer.

- Fully Compatible With Commodore C84/C128 Computers
- 120 CPS Draft/30 CPS NLQ
- Fully Printshop Software Compatible
- Easy Front Panel Operation
- Automatic Paper Feed
- Both Tractor & Friction Feed
- Cable Included
- Optional Automic Cut Sheet Feeder
- Full One-Year Manufacturer's Warranty

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"Quality, Capability & Reliability"

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The NEW Star NX-1000C has a wide choice of pitches and print styles for you to choose from. The NX-1000C will make your Commodore computer shine with plenty of options for attractive and creative text printing. And the NX-1000C's "paper parking" feature gives you the best of both worlds. You can feed single sheets without removing sprocket paper.

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- 144 CPS Draft/36 CPS NLQ
- Choose From 20 Type Styles From Front Panel
- Both Friction and Push Tractor Feed
- 4K Print Buffer
- Special "Paper Parking" Feature
- User-Friendly Front Panel Operation
- Original Plus 2 Copy Capacity
- Full One-Year Manufacturer's Warranty

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		Retail	Sale
NX-10	120 CPS + NLQ, Epson/IBM Compatible	$349	~~$189~~
NX-10C	Commodore Compatible	349	~~179~~
NX-1000	NEW Multi-Font Selection, 144 CPS, 4K, Paper Parking	299	~~179~~
NX-1000C	Commodore Compatible	299	~~179~~
NX-1000CL	Prints 7 Colors	379	~~249~~
LV-1215	120 CPS, IBM Compatible, 136 Column	499	~~199~~
LV-1615	160 CPS, IBM Compatible, 16K, 136 Column	699	~~239~~
LV-2015	200 CPS, IBM Compatible, 16K, 136 Column	799	~~299~~
SD-10	160 CPS, IBM/Apple Comp., Parallel Interface	599	~~219~~
SD-15	160 CPS, IBM/Apple Comp., 15" Carriage	749	~~249~~
SR-10	200 CPS, IBM Compatible, Parallel Interface	679	~~229~~
SR-15	200 CPS, IBM Compatible, 15" Carriage	799	~~299~~
NX-15	120 CPS + NLQ, Epson/IBM Comp., 15" Carriage	529	~~319~~
NR-10	240 CPS, Epson/IBM Comp., 12.6K Print Buffer	579	~~389~~
NR-15	240 CPS, Epson/IBM Comp., 12.6K, 15" Carriage	799	~~439~~
NB24-10	24-Pin, 180 CPS, Epson/IBM Compatible, 8K	749	~~449~~
NB24-15	24-Pin, 180 CPS, Epson/IBM Comp., 15" Carriage	999	~~569~~
NB-15	24-Pin, 300 CPS + NLQ, Epson/IBM Comp., 15" Carriage	1399	~~649~~
PowerType	18 CPS Daisywheel, Both Parallel & Serial Interfaces	599	199
Star Printer Ribbons		As Low As 99¢ each	

ATTENTION DEALERS

Let us help you maximize your profits and minimize your inventory costs. Our exciting prices and fast delivery will make your bottom line look great!
Call 800-528-4504. In Ohio call 800-222-6571.

VISA MasterCard AMERICAN EXPRESS

For your protection we check thoroughly for stolen credit cards.

CALL TOLL FREE FOR INFORMATION OR ORDER
(800) 423-8215
IN OHIO CALL - (800) 321-7731 • FROM ANYWHERE CALL (513) 368-2309
OHIO DEALERS CALL - (800) 222-6571 • DEALERS CALL (800) 528-4504
HOTLINE: 513-368-2307 (For Technical Assistance or Information on Your Order)

MONDAY-FRIDAY
9 AM - 6 PM (EST)
CLOSED SATURDAY
PRICES SUBJECT TO CHANGE
AVAILABILITY AND TYPE ERRORS

MidWest Micro-Peripherals

6910 U.S. Route 36 East, Fletcher, OH 45326

MEMBER DIRECT MARKETING ASSOCIATION

All equipment shipped factory fresh with manufacturers warranty

HIGH TECHNOLOGY — NOT HIGH PRICES

NEW brother HR-40 PRINTER

SAVE WITH CONFIDENCE – CALL MIDWEST MICRO

NO TAX CHARGED TO RESIDENTS OUTSIDE OHIO
SAME DAY SHIPPING ON ALL ITEMS IN STOCK
TECHNICAL SUPPORT

PRICE GUARANTEE
We at MidWest Micro guarantee that we can save you up to 75% or more on your purchase of new fully warranteed equipment and supplies. And we will still give you friendly, courteous service. Call today and Save With Confidence!

ONE CALL SHOPPING TOLL FREE
DEALERS CALL
800-528-4504

MidWest Micro-Peripherals
6910 U.S. Route 36 East, Fletcher, Ohio 45326
Phone: (513)368-2309

Fellow Computer User,

As you have probably learned, there is still no real substitute for the daisywheel printer when you need true "letter quality" printing. Because of this fact and our continued strong daisywheel printer sales, I am especially happy to offer you a truly innovative new printer from Brother. It's features and value are beyond compare.

Not only does the Brother HR-40 bring to you a free tractor feed mechanism as an integral feature, but it also gives you, at no additional cost, a built in, fully automatic cut sheet feeder. And with Brother's unique "paper parking" feature, you don't even have to remove the paper to switch from continuous forms to letterhead and back again. These features, plus the many others mentioned in this ad, make the HR-40 by far the best daisywheel printer value to be found.

Please call today and let us surprise you with our generous introductory discount price offering! Your office will be quieter, more productive and overall, a more pleasant place to work.

Sincerely,
Mark L. Runkle
Mark L. Runkle
President

The Brother HR-40 is the first daisywheel printer to offer both a built-in forms tractor and a single-bin sheet feeder. This, plus both parallel and serial interfaces, fast print speed, a large buffer memory, copy feature, unique "paper parking", etc., etc., . . . makes the HR-40 the unquestioned leader in the daisywheel printer market.

ATTENTION DEALERS

Let MidWest Micro help you maximize your profits and minimize your inventory costs. Our exciting prices and delivery schedules will improve your bottom line. DEALERS CALL 800-528-4504, In Ohio 800-222-6571, From anywhere call 513/368-2650.

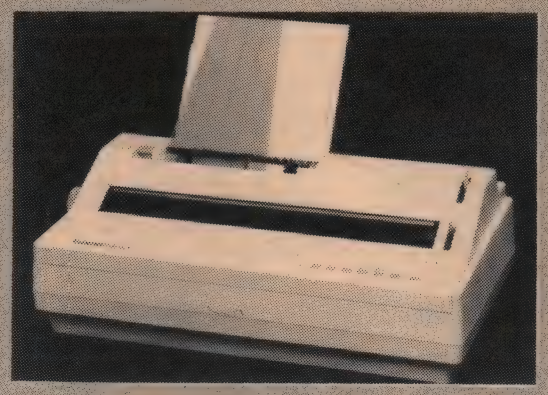
HR-40 includes tractor and sheet feeder plus paper parking.

Introductory Special

$649

Even Less!

Retail $899



- 136 column wide paper carriage
- Fast 40 cps print speed
- Both cent. parallel and RS232 serial interfaces
- Unique "Paper Parking" feature lets you switch from continuous forms to single sheets without removing and reloading paper (a secretary's delight!)
- Huge 8K print buffer expandable to 16K
- Built-in forms tractor
- Built-in single bin automatic cut sheet feeder
- Optional keyboard feature allows HR-40 to double as a full-featured intelligent typewriter
- Uses standard Brother/Diablo compatible codes
- Unique Brother 2-color printing capability

More brother Printer Savings

		Sugg. Retail	Your Price
PRINTERS			
HR-15XL	Parallel or Serial, 17 CPS Daisywheel, Parallel & Serial	$ 599	~~$299~~
HR-20	22 CPS Daisywheel, Parallel & Serial, 8K	549	~~359~~
HR-40	40 CPS Daisywheel, P & S, Tractor and Sheet Feed, 8K, 136 Col. Carriage	899	~~649~~
Twinriter 6	Daisywheel (35 CPS) & Dot Matrix (200 CPS), 136 Col. Carriage	1395	~~899~~
M-1509	180 CPS, Parallel & Serial, Epson/IBM Compatible, 136 Col. Carriage	599	~~259~~
M-1709	240 CPS + NLQ, Epson/IBM/Comp., Paper Park, 24K, 136 Col. Carriage	749	~~489~~
M-1724L	24-Pin, 216 CPS, IBM/Epson/Diablo Comp., 15K, 136 Col. Carriage	949	~~629~~
PRINTER ACCESSORIES			
TF-50	HR-15XL Tractor Feed	$149	**$ 99**
TF-100	HR-25/35 Tractor Feed (Also Fits Datasouth DW-26 & Comrex CR-4)	169	**119**
TF-150	HR-20 Tractor Feed	169	**99**
TF-300	Twinriter 5 Tractor Feed	169	**129**
CF-100	HR-25/35 Cut Sheet Feeder Plus CR4 & DW36	299	**125**
CF-300	Twinriter 5 Cut Sheet Feeder	325	**259**
SF-40	M-1509/1709 Cut Sheet Feeder	179	**129**
KB-50	HR-15XL Typewriter Keyboard	220	**89**
KB-150	Typewriter Keyboard for Diablo Comp. Par. Printers	299	**$CALL$**
LQ-200	M-1509/1709 Font & Buffer Board	149	**89**
Wheel	Cassette Daisywheel	25	Low As **$15**

PRINTER RIBBONS
Brother Cartridge Ribbons — Low as **$1.99** each
(Multistrike Film, One-Time Film, Nylon Fabric, Correctable Film, Red Tape, Correction Tape, Twinriter 5 Multistrike & Fabric)

VISA MasterCard AMERICAN EXPRESS
For your protection we check thoroughly for stolen credit cards.

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IN OHIO CALL - (800) 321-7731 • FROM ANYWHERE CALL (513) 368-2309
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6910 U.S. Route 36 East, Fletcher, OH 45326

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ALPS Business Printer

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We at MidWest Micro guarantee that we can save you up to 75% or more on your purchase of new fully warranteed equipment and supplies. And we will still give you friendly, courteous service. Call today and Save With Confidence!

ONE CALL SHOPPING TOLL FREE
DEALERS CALL
800-528-4504

MidWest Micro-Peripherals
6910 U.S. Route 36 East Fletcher, OH 45326
Phone: (513) 386-2309

Dear Valued Customer,

MidWest Micro has proudly become your dealer for one of the fastest growing printer companies in the country. . . ALPS America. We have examined the ALPS printer family and are convinced that the ALPS ALQ218 has what it takes to dazzle you.

The ALQ218 prints superb letter quality text and high resolution colors and it will do it for you quickly, easily and economically. ALPS printers are the first dot matrix printers with resolution high enough to be called "letter quality".

The ALQ218 is the most versatile printer ever with standard color graphics capability, an aggressive 18 pin print head (giving Epson FX and IBM compatibility) and the ability to exchange the 18 pin head with a 24 pin head to have Epson LQ compatibility. There's really nothing else to ask for!

The ALQ218 is an exceptionally well thought-out machine that's easy for you to use, fast and versatile. No other printer company has included so many useful features or bothered to make printing so easy.

Why don't you give us a call today and start enjoying this exceptional printing machine.

Sincerely,

Mark L. Runkle
President

P.S. – The ALPS ALQ218 printer offers you more than any printer in its price range.

Precisely Engineered & Rugged

ALPS ALQ218
AMERICA

Retail $595

Only **$399** (Introductory Price)
Qty. 3+ **$385**

- 18-Pin (Dual 9-Pin)
- 200 CPS
- 7 Colors

The Alps ALQ218 handles all your color and letter quality text printing *better, faster* and *easier*!

- Fast 200 CPS Draft/100 CPS Letter Quality
- Heavy Duty Business Quality Construction
- IBM/Epson Compatible
- 7K Buffer Memory (Upgradable to 71K)
- Standard Parallel Interface
- 7 Color Printing Standard
- High Resolution Graphics
- Snap In/Out Interchangeable 18-Pin or 24-Pin Print Head. (24-Pin Optional)
- Front Panel Controls *All* Printing Functions
- Memory To Remember Settings After Power Turned Off
- Exceptionally Quiet 55 dBA
- Full One-Year Warranty

ALPS ALQ 318
AMERICA
16" Wide Carriage Printer

- 18-Pin (Dual 9-Pin)
- 200 CPS
- 7 Colors

- Fast 200 CPS Draft/100 CPS LQ
- Heavy Duty Business Quality Construction
- Both IBM and Epson Compatible
- 7K Print Buffer Memory (Upgradeable to 71K)
- Standard Parallel Interfaces
- 7 Color Printing Standard
- High Resolution Graphics
- Snap InOut 18-Pin or 24-Pin Print Head (24-Pin Optional)
- Front Panel Controls All Printing Functions
- Memory To Remember Settings After Power Turned Off
- Exceptionally Quiet 55 dBA
- Full One-Year Warranty

Retail $895 *Only* **$599** *(Introductory Price)* Qty. 3+ **$588**

ATTENTION DEALERS AND VAR'S!
Let us help you maximize your profits and minimize your inventory costs. Our exciting prices and delivery schedules will make your bottom line look great! Call 800-528-4504. In Ohio call 800-222-6571.

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All equipment shipped factory fresh with manufacturers warranty

HIGH TECHNOLOGY — NOT HIGH PRICES

CLASSIFIED

CLASSIFIED INFORMATION

The classifieds are for **Pre-Owned Items & Software ONLY.** Ads for new equipment must be inserted in the regular display advertising sections including the Showcase Ad section. No logos, or photos, or any other illustrations can be used in the classified ad section.

Instructions

In order for us to keep the ad rate low and insure accuracy, it is necessary that the following procedures are followed.

1. Type or print your ad legibly on a plain sheet of paper. Ads received that are difficult to read will be returned.
2. Write the desired category at the top of each ad. Please refer to the index, this page, if a category is not indicated, ad will be placed in the Miscellaneous section.
3. If more than one ad is submitted, use a separate piece of paper for each ad, making sure your complete name and address is at the bottom of each ad.

CLOSING DATE — 2nd Monday of the month. Example: Ads received by the 2nd Monday of May will appear in the July issue. **Due to our low rates, you cannot change, cancel or receive a refund on classifieds after they are typeset.** In most cases, ads are typeset within a week after they are received.

RATES

IMPORTANT: Classified rates as of Jan. 1, 1988 — $1.00 per word, $15 per ad minimum charge. The first two words (if underlined) will be set in bold face at no extra charge. Boldface thereafter will be $.50 additional charge per word. Special bold headings, partial lines, open space or leader dots are:

1 line of leader dots with price, $2.50 per line
6.5 point line, $2.50
10 point bold line, $4.00
Maximum of 15 characters per line

REPEAT ADS

Ads running more than one time. A repeat ad will be coded at the end of the ad with month the ad started and issue ad ends. Example: 8-160. Ad started Aug. ends 160 issue or January. NOTE: Please check to make sure your ad has been correctly coded.

PROOFS

Due to low classified rates a free checking copy or tear sheet cannot be sent if proof of insertion is desired, please send $3.00 extra.

Be sure to include the cost with your ad payment.

PHOTOS

No photos or logos will be allowed in classified ads.

STARS

A line of STARS may be used to draw attention to your ad. Only one size is available at a charge of $5.00.

★ ★ ★ $5.00

CS-ABREVIATIONS

add-post ..... add postage
add-post-AP ..... add postage, all prices
FC ..... Freight Collect
MBG ..... money back guarantee
PP ..... postage paid
SASE ..... send self-addressed stamped evelope for check return or information requested
10 DRP ..... 10 day return privilege
CCR ..... check clearance required

EXAMPLES OF STYLES:

Normal

PDP 11/03 COMPUTER. Complete operating system with RT-11 system software plus basic. Brand new October '78. Sell complete at $7,000 or separate at: 11/03 Computer $900, Dual RX-1 disk $1,000. 32KB memory $2,800. VT-52 video $1,500, GE Terminet 30 printer $800. Intertube video terminal $400. **John Doe,** POB 1234, Somewhere, USA 00000. 123-456-7890.

PDP 11/03 COMPUTER
Complete **OPERATING SYSTEM** with RT-11 system software plus basic. Brand new October '78. Sell complete at $7,000, or separate at:
11/03 Computer $900
Dual RZ-1 disc $1,000
32KB memory $2,800

10 Point Centered Head

PDP 11/03 COMPUTER

Complete **OPERATING SYSTEM** with RT-11 system software plus basic. **Joe Doe,** POB 1234, Somewhere, USA 00000, 123-456-7890.

Leader Dots

Intertube video terminal $400
Joe Doe, POB 1234, Somewhere, USA 00000. 123-456-7890.

IMPORTANT NOTICE

Copyright laws pertaining to software can be enforced. Due to the complexity of determining what software is legal or illegal, any and all liability for copyright violations shall rest solely upon the advertiser. Patch Communications and its staff do not in any way condone or knowingly participate in any such illegal activity.

(101) TANDY COMPUTERS FOR SALE

LAPTOPS
100/200/600
USED STUFF

We have many Radio Shack Model 100 programs starting at ONLY $10.00 each.
Model 100 32k $275
Model 102 32k $325
Modle 200 24k $325
Model 600 ..... $425
Bar Code Wand $60
Disk Drives ..... CALL
Disk Video Interface $175
Printer OR Modem Cable $10
ROMS.....CALL.....CALL.....CALL
We Buy. Sell & Horsetrade TRS Laptops & Accessories. CALL!!. **Shreve Systems** 2421 Malcolm St, Shreveport, LA 71108.

318-865-6743.

06-102

Model 12, 1 disk drive $350
Model 4, 128K, 2 disk drives $425
Model 2, drive expansion chasis $175
Model 2, 8-meg hard drive controller $95
Model 2, power supply $35
Model 1000, SX power supply $55
Model 100, LCD display $75
Model 100, cloth carrying case $25
Misc software SASE for list. Shipping extra. **Computer Reset** Box 461782, Garland, TX 75046, 214-276-8072.

COCO Public Domain programs. Over 100 packs on disk or cassette as low as $3.50. Send for free catalog. **P.D. Software** PO Box 130256-CC, Houston, TX 77219. 06-103

Color Computer for sale: Full system: 64K, monochrome monitor, multipack interface, 3 drives, RS232 Pak, DMP130 Printer, modem, lots of software. Make an offer. I deliver in NJ. Write to: **John Briar,** 186 Pennsylvania Way, N. Brunswick, NJ 08902.

MOD16 512K 1 floppy, 15MEG HD; DTI Terminal; Modem with TRS-DOS Xenix Scripsit, $1250; **506-634-3613,** Days. 04-102

CLASSIFIED ORDER FORM

Classified Dept., COMPUTER SHOPPER
P.O. Box F, Titusville, FL 32781

To figure cost of ad, the rate is $1.00 per word for subscribers (50 cents extra per word bold face) $15.00 per ad minimum charge.

Run under heading # _____
See Index This Page
(Please type or print)

INCLUDE $1.00 PER WORD FOR YOUR NAME AND ADDRESS

_____ _____ _____
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_____ _____ _____

Name _____
Address _____
City _____
State _____ Zip _____

INCLUDE $1.00 PER WORD FOR YOUR NAME AND ADDRESS FOR SUBSCRIBERS.

(For additional words, use separate sheet of paper)

Remittance for $ _____ is enclosed.
You may run my ad _____ issues.

CLASSIFICATION NUMBER AND CATEGORY

COMPUTERS (Large)
(133) Burroughs Systems 500
(136) Data General Systems 500
(138) Data General, Software, Peripheral 000
(148) DEC Systems For Sale 500
(149) DEC Systems Wanted 000
(150) DEC Software, Peripheral 000
(154) IBM Systems For Sale 000
(155) IBM Systems Wanted 000
(156) IBM, Software, Peripheral 500
(166) Misc. (Hardware & Software) 500

MICRO COMPUTERS
(105) Altos Computers For Sale 487
(105A) Altos Computers Wanted 000
(105B) Altos Software, Peripheral 000
(106) Apple Computers For Sale 488
(107) Apple Computers Wanted 488
(108) Apple Software, Peripheral 488
(109) Atari Computers For Sale 490
(110) Atari Software, Peripheral 490
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(113A) Commodore Computers Wanted 490
(113B) Commodore Software, Peripheral 490
(113C) Epson Computers For Sale 491
(114) Franklin Computers For Sale 000
(115) IBM Personal Computers For Sale 491
(115A) IBM Personal Computers Wanted 000
(115B) IBM Software, Peripheral 491
(132) Heath Computers For Sale 497
(132A) Heath Software, Peripherals 497
(134) Hewlett Packard Computers For Sale 500
(134A) Hewlett Packard Computers Wanted 500
(134B) Hewlett Packard Software, Periph. 500
(111) Homebrew Systems For Sale 000
(116) NEC Computers For Sale 497
(116A) NEC Computers Wanted 497
(116B) NEC Software, Peripheral 497
(112) Northstar Computers 490
(112B) Northstar Software, Peripheral 000
(117) Ohio Scientific Computers 000
(117A) Ohio Scientific Computers Wanted 000
(117B) Ohio Scientific Software Peripheral 000
(118) Osborne Computers For Sale 000
(118A) Osborne Computers Wanted 000
(118B) Osborne Software, Peripheral 000
(120) MS/DOS Computers For Sale 000
(120A) MS/DOS Computers Wanted 497
(120B) MS/DOS Peripherals 000
(121) Kaypro Computers For Sale 497
(121A) Kaypro Computers Wanted 000
(121B) Kaypro Software, Peripherals 000
(123) Sanyo Computers For Sale 497
(123A) Sanyo Computers Wanted 000
(123B) Sanyo Software, Peripherals 497
(125) Sinclair Computers For Sale 000
(125A) Sinclair Computers Wanted 000
(125B) Sinclair Software, Peripheral 497
(101) Tandy Computers For Sale 486
(102) Tandy Computers Wanted 487
(103) Tandy Software, Peripheral 487
(104) Texas Instr. Computers For Sale 487
(104A) Texas Instr. Computers Wanted 000
(104B) Texas Instr. Software, Peripheral 487
(127) Xerox Computers For Sale 000
(127A) Xerox Computers Wanted 497
(127B) Xerox Software, Peripheral 000
(126) Misc. Microcomputers 497
(128) Misc. Micro, Software, Periph. 497
(129) S-100 Computers 497
(130) S-100 Compatible Peripheral 000
(131) S-50 Compatible Peripheral 497

PERIPHERAL & MISC. EQUIPMENT
(172) Disk Drives 500
(174) Printers 500
(178) Tape Drives 501
(180) CRTS, Monitors 501
(181) CRT Terminals 000
(182) Terminals 501
(183) Multibus Boards 000
(184) Memory 000
(186) Modems 501
(187) Word Processing 000
(188) Misc. Equipment 501
(189) Books, Magazines 501
(190) Misc. Large Systems 000
(191) CP/M Software 501
(192) Misc. Software 501
(194) Misc. Accessories & Supplies 502
(194A) Minicomputers 000
(195) IC's and Components 502

MISCELLANEOUS
(196) Help Wanted 502
(198) Positions Wanted 000
(199) Other 502
(200) Non-Computer 502

MODEL 100 with portable drive & extra software. Best offer. **Joe Wysong.** 914-691-7192.

MODEL 4 system with external hard disk, printer & tons of software. Best offer. **Joe Wysong.** 914-691-7192.

RS COCO II with Multi-pack interface, excellent condition, best offer, **Lyle's Computer Repair,** 815-338-1072. 6-102

Radio Shack model 12 dual drives DOS manuals cables four to sell $600.00 each with 8 meg hard drive $850.00. **Arthur Mouton** PO Box 52269, Lafayette, LA 70505.

Repairs: TRS-80 all-models, Atari 8-bits, Commodore C64/128. Memory upgrades most models. Ph. **305-773-0749.** 05-102

TANDY 6000HD, 15 Meg. with two additional terminals and DMP 2200 printer. Xenix and Profile16. **1-205-246-5761.** Alabama Physical Therapy, PO Box 37, Jackson, AL 36545.

TRS-80 Model-I w/Expansion, Monitor, Printer, Two Disk Drives, Manuals. Software includes Fortran, Visicalcs. $250; **609-881-0455,** Evenings.

Tandy 2000 two disk drives, Hi-Res color graphics, CM-1 color monitor, mouse, modem, 786k ram, over $2500 worth software, $1500 for all, excellent condition, **301-761-1668, 301-765-3760.**

WANTED

Shreve Systems buys GOOD Apples, IBM's & Laptops, printer parts & accessories. NO JUNK PLEASE!!! **SHREVE SYSTEMS** 2421 Malcom St., Shreveport, LA 71108.
318-865-6743 03-103

$$$$ We have a limited selection of models III's for $495 and model IV's for $695. We give a full 90 day warranty. Buy-Sell-Trade. **Godfather's Used Computer Syndicate,** PO Box 3037, 851 W. Hwy 436, Forest City, FL 32714. 305-774-1111.

(102) TANDY COMPUTERS WANTED

TANDY 2000 H.D. 30meg minimum 384K + memory monochrome, OK. Days **907-562-2077,** nights 907-243-2559.

(103) TANDY SOFTWARE, PERIPHERAL

16/6000 XENIX

V3.0 PAL-CHIPS, $39.95, 6MHz/CPU Boards, $99.95; **John Peeples,** Box 9703, Charleston, SC 29410, 803-553-6117.

★ ★ ★

Color computer programs for only 50¢ each! Many machine language! Send $5.00 for 10 programs on tape or disk or write for free catalog. **Coco Software,** PO Box 1256, Holland MI 49422-1256. 616-399-9648. 06-106

DOUBLE SIDE TRSDOS 1.3 R/S MOD 3 DOS. Gain full read/write access to double sided floppy drives. 100% compatible with all software, even basic. $29.95 US funds. **DBSIDE,** Suite 209-1051, KLO Rd. Kelowna, British Columbia, Canada V1Y-4X6.06-102

Earn $1100 Per Month With Your TRS-80, Apple, Commodore or IBM Compatible. This program will allow you to enjoy a handsome full or part-time income working in your own home and setting your own hours. This unique program has been tested and used for over **seven** years and its service has had phenominal acceptance. We provide all the know-how, the consultation service, and all the materials needed to make this unusual business opportunity a success from the first day. For complete details, send $10 (VISA, MASTERCARD and AMERICAN EXPRESS honored) to: **Viking, Inc.,** 910 Soo Blvd., Rice Lake, WI 54868. Ask for "OPPORTUNITY 88".

F R E E SOFTWARE!

Tandy original software, ALL Radio Shack models. For details and catalog, specify model, send $1.00 and LSASE to: **FREE SOFTWARE SPECIAL,** Box 72189, Columbus, OH 43207. 04-101

Model 100/102/200 affordable portable software, also for NEC-8201. Send for free information. **CSA Software,** Box 22261 Chattanooga, TN 37422. 02-101

New Programs from the Valley TRS80 Hackers' Group MI/III/4 library. SASE for catalog. Sample disk $5. **VTHG,** Box 9747, North Hollywood, CA 91609.06-106

PUBLIC DOMAIN SOFTWARE, MODEL 3 AND 4, COMPUTER PROGRAMS AT AFFORDABLE PRICES, FREE CATALOG DISKS, **THE JaRICK COMPANY,** P.O. BOX 22708, ROBBINSDALE, MN 55422. 01-106

Pickles & Trout CP/M-2.2m for your Model-II, –12, –16, and –6000. Consider adding RAM disk using your 68000 memory. Contact **TriSoft,** 1825 East, 38, Austin, Texas 78722. 1-800-531-5170. 05-105

Rent Domain/Commercial $2/3 disk! Tandy 1000 software—Rent $2—Buy $3 (including DS/DD disk). Ship US/APO/FPO/Canada. 804-853-3441. **Colony,** 728 Muskogee, Norfolk, VA 23509. 05-101

TANDY ORIGINAL SOFTWARE * 60-90% off retail! All Tandy/TRS80 computers (specify model). Send $1.00 & LSASE for catalog: **KMA,** Box 72189, Columbus, OH 43207. 6-103

WORD PROCESSOR. Full-featured, in BASIC w/mailmerge, fonts, graphics, manual. Models I, III, 4, 16K-48K. Specify system. $12 disk/tape. Hinrichs, 2116 SE 377th, Washougal, WA 98671.

TRS-80 SUPPORT monthly publication ($18) per year. ($2) for sample. **Computer News** 80, P.O. Box 680, Casper, WY 82602. 6-102

★ ★ ★

Tandy 1000 programs/Newsletter. Send for information. **Soda Pop Software,** PO Box 653, Kenosha, WI 53141. 04-107

WANTED

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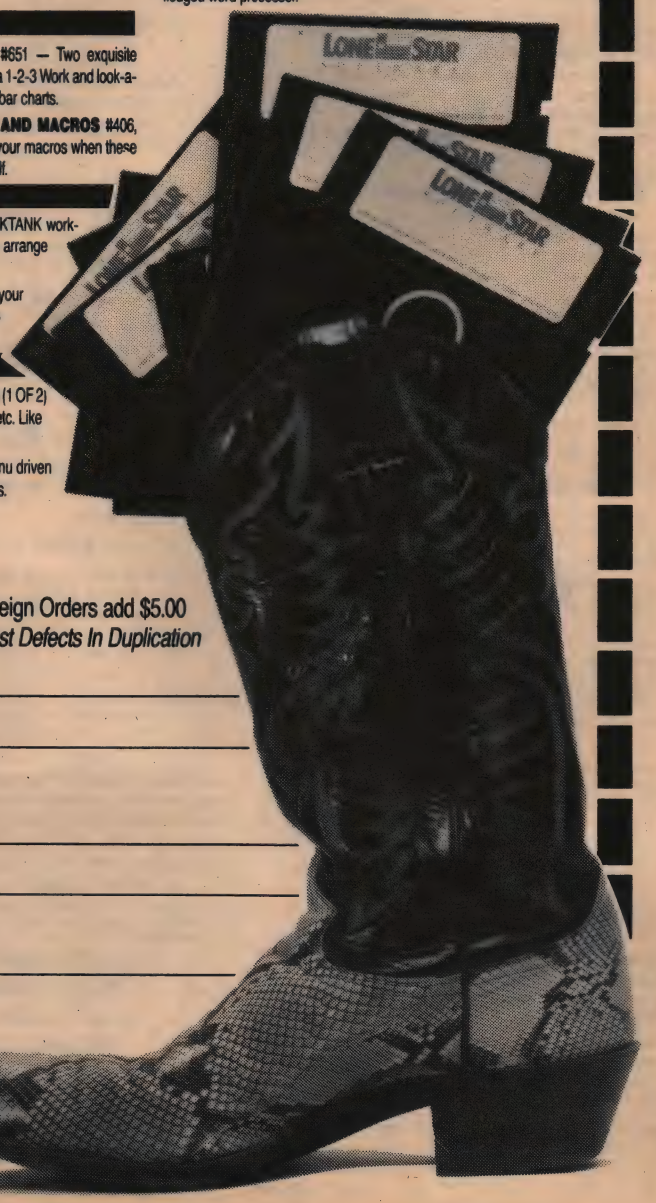

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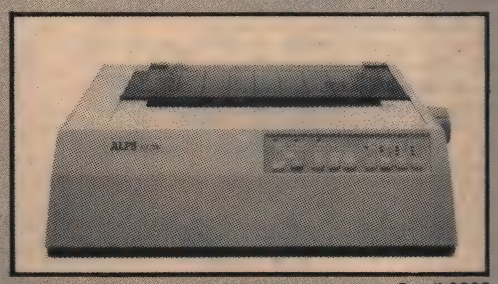

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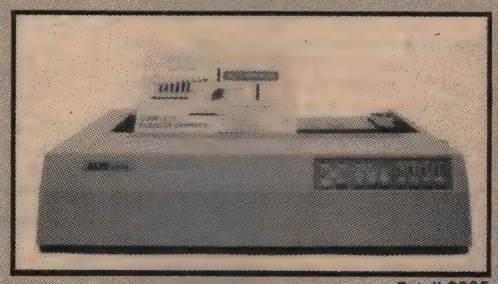

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7400

Part No.	1-9	10+	Part No.	1-9	10+
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7404	.29	.19	7489	2.05	1.95
7405	.35	.25	7490	.49	.39
7406	.39	.29	7493	.45	.35
7407	.39	.29	74121	.45	.35
7408	.35	.25	74123	.55	.45
7410	.29	.19	74125	.55	.45
7414	.49	.39	74126	.69	.59
7416	.39	.29	74143	3.95	3.85
7417	.39	.29	74150	1.35	1.25
7420	.35	.25	74154	1.35	1.25
7430	.35	.25	74158	1.59	1.49
7432	.39	.29	74173	.85	.75
7438	.39	.29	74174	.59	.49
7442	.55	.45	74175	.59	.49
7445	.79	.69	74176	.99	.89
7446	.89	.79	74181	1.95	1.85
7447	.89	.79	74189	1.95	1.85
7448	2.05	1.95	74193	.79	.69
7472	.89	.79	74198	1.85	1.75
7473	.39	.29	74221	.99	.89
7474	.39	.29	74273	1.95	1.85
7475	.49	.39	74365	.65	.55
7476	.45	.35	74367	.65	.55

74LS

74LS00	.29	.19	74LS165	.75	.65
74LS02	.29	.19	74LS166	.99	.89
74LS04	.35	.25	74LS173	.59	.49
74LS05	.35	.25	74LS174	.49	.39
74LS06	1.09	.99	74LS175	.49	.39
74LS07	1.09	.99	74LS189	4.59	4.49
74LS08	.29	.19	74LS191	.59	.49
74LS10	.29	.19	74LS193	.79	.69
74LS14	.49	.39	74LS221	.69	.59
74LS27	.35	.25	74LS240	.69	.59
74LS30	.29	.19	74LS243	.69	.59
74LS32	.35	.25	74LS244	.69	.59
74LS42	.49	.39	74LS245	.89	.79
74LS47	.99	.89	74LS259	.99	.89
74LS73	.39	.29	74LS273	.89	.79
74LS74	.35	.25	74LS279	.49	.39
74LS75	.39	.29	74LS322	4.05	3.95
74LS76	.55	.45	74LS365	.49	.39
74LS85	.59	.49	74LS366	.49	.39
74LS86	.35	.25	74LS367	.49	.39
74LS90	.49	.39	74LS368	.49	.39
74LS93	.49	.39	74LS373	.79	.69
74LS123	.59	.49	74LS374	.79	.69
74LS125	.49	.39	74LS393	.89	.79
74LS138	.49	.39	74LS590	6.05	5.95
74LS139	.49	.39	74LS624	2.05	1.95
74LS154	1.09	.99	74LS629	2.95	2.85
74LS157	.45	.35	74LS640	1.09	.99
74LS158	.45	.35	74LS645	1.09	.99
74LS163	.59	.49	74LS670	1.09	.99
74LS164	.59	.49	74LS688	2.39	2.29

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74S04	.29	74S189	1.69
74S08	.35	74S196	2.49
74S10	.29	74S240	1.49
74S32	.35	74S244	1.49
74S74	.45	74S253	.79
74S85	1.79	74S287*	1.49
74S86	.49	74S288*	1.49
74S124	2.75	74S373	1.49
74S174	.79	74S374	1.49
74S175	.79	74S472*	2.95

74F

74F00	.29	74F139	.69
74F04	.29	74F157	.69
74F08	.29	74F193	2.95
74F10	.29	74F240	.99
74F32	.29	74F244	.99
74F74	.39	74F253	.69
74F86	.39	74F373	.99
74F138	.69	74F374	.99

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CD4001	.19	CD4076	.59
CD4008	.69	CD4081	.25
CD4011	.19	CD4082	.25
CD4013	.29	CD4093	.35
CD4016	.29	CD4094	.89
CD4017	.49	CD40103	2.49
CD4018	.59	CD40107	.49
CD4020	.59	CD40109	.79
CD4024	.49	CD4510	.69
CD4027	.35	CD4511	.69
CD4030	.29	CD4520	.75
CD4040	.65	CD4522	.79
CD4049	.29	CD4538	.79
CD4050	.29	CD4541	.89
CD4051	.59	CD4543	.79
CD4052	.59	CD4553	4.95
CD4053	.59	CD4555	.79
CD4063	1.49	CD4559	7.95
CD4066	.29	CD4566	2.49
CD4067	1.29	CD4583	.89
CD4069	.25	CD4584	.39
CD4070	.25	CD4585	.89
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Z80A-CTC		1.79
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80387-20	Math Co-processor (20MHz) GRID ARRAY	$795.95

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4128-20	131,072 x 1	(200ns) (Piggyback) ~~9.25~~	2.75
*4164-100	65,536 x 1	(100ns)	3.49
*4164-120	65,536 x 1	(120ns)	2.75
*4164-150	65,536 x 1	(150ns)	2.49
*4164-200	65,536 x 1	(200ns)	1.95
*TMS4416-12	16,384 x 4	(120ns)	7.49
*41256-80	262,144 x 1	(80ns)	10.95
*41256-100	262,144 x 1	(100ns)	9.95
*41256-120	262,144 x 1	(120ns)	8.95
*41256-150	262,144 x 1	(150ns)	8.75
*50464-15	65,536 x 4	(150ns) (4464)	7.95
*511000P-10	1,048,576 x 1	(100ns) 1 Meg	49.95
*514256P-10	262,144 x 4	(100ns) 1 Meg	89.95

STATIC RAMS

*2016-12	2048 x 8	(120ns)	1.69
2018-45	2048 x 8	(45ns) ~~6.95~~	5.49
2102	1024 x 1	(350ns)	.89
2114N	1024 x 4	(450ns)	.99
2114N-2L	1024 x 4	(200ns) Low Power	1.49
21C14	1024 x 4	(200ns) (CMOS)	.49
5101	256 x 4	(450ns) CMOS	1.95
*6116P-3	2048 x 8	(150ns) CMOS	3.39
*6116LP-3	2048 x 8	(150ns) LP CMOS	4.29
*6264LP-12	8192 x 8	(120ns) LP CMOS	4.49
*6264P-15	8192 x 8	(150ns) CMOS	3.89
*6264LP-15	8192 x 8	(150ns) LP CMOS	3.95
6514	1024 x 4	(350ns) CMOS	3.49
43256-15L	32,768 x 8	(150ns) Low Power	11.95

EPROMS

TMS2516	2048 x 8	(450ns) 25V	6.95
TMS2532	4096 x 8	(450ns) 25V	6.95
TMS2532A	4096 x 8	(450ns) 21V	5.95
TMS2564	8192 x 8	(450ns) 25V	9.95
TMS2716	2048 x 8	(450ns) 3 Voltage ~~9.95~~	6.95
1702A	256 x 8	(1μs) ~~6.95~~	4.95
2708	1024 x 8	(450ns)	4.95
2716	2048 x 8	(450ns) 25V	3.75
2716-1	2048 x 8	(350ns) 25V	4.25
27C16	2048 x 8	(450ns) 25V (CMOS)	5.49
2732	4096 x 8	(450ns) 25V	3.95
2732A-20	4096 x 8	(200ns) 21V	4.25
2732A-25	4096 x 8	(250ns) 21V	3.95
27C32	4096 x 8	(450ns) 25V (CMOS)	5.95
2764-20	8192 x 8	(200ns) 21V	4.25
2764-25	8192 x 8	(250ns) 21V	3.75
2764A-25	8192 x 8	(250ns) 12.5V	3.95
2764-45	8192 x 8	(450ns) 21V	2.95
27C64-15	8192 x 8	(150ns) 21V (CMOS)	6.49
27128-20	16,384 x 8	(200ns) 21V	6.95
27128-25	16,384 x 8	(250ns) 21V	5.95
27128A-25	16,384 x 8	(250ns) 12.5V	5.25
27C128-25	16,384 x 8	(250ns) 21V (CMOS)	6.95
27256-20	32,768 x 8	(200ns) 12.5V	6.95
27256-25	32,768 x 8	(250ns) 12.5V	5.95
27C256-25	32,768 x 8	(250ns) 12.5V (CMOS)	7.95
27512-20	65,536 x 8	(200ns) 12.5V	13.49
27512-25	65,536 x 8	(250ns) 12.5V	11.95
68764	8192 x 8	(450ns) 25V	13.95

EEPROMS

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2817A	2048 x 8	(350ns) 5V Read/Write	7.95
2865A	8192 x 8	(250ns) 5V Read/Write	9.95
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6532	~~6.49~~	5.49
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74HC00	~~.25~~	.19	74HC175	~~.69~~	.49
74HC02	~~.25~~	.19	74HC221	~~1.19~~	.89
74HC04	~~.29~~	.19	74HC240	~~.99~~	.69
74HC08	~~.29~~	.19	74HC244	~~.99~~	.69
74HC10	~~.29~~	.19	74HC245	~~.99~~	.79
74HC14	~~.49~~	.29	74HC253	~~.59~~	.49
74HC30	~~.29~~	.19	74HC259	~~.99~~	.49
74HC32	~~.29~~	.25	74HC273	~~.99~~	.69
74HC74	~~.99~~	.29	74HC373	~~.99~~	.65
74HC75	~~.99~~	.35	74HC374	~~.99~~	.65
74HC76	~~.45~~	.35	74HC595	~~1.29~~	1.09
74HC85	~~.79~~	.55	74HC688	~~.99~~	.79
74HC86	~~.99~~	.35	74HC943		8.95
74HC123	~~.99~~	.69	74HC4040	~~.99~~	.79
74HC125	~~.49~~	.39	74HC4049	~~.59~~	.49
74HC132	~~.69~~	.39	74HC4050	~~.59~~	.49
74HC138	~~.49~~	.39	74HC4060	~~.99~~	.89
74HC139	~~.49~~	.39	74HC4511	~~1.29~~	1.09
74HC154	~~1.49~~	1.19	74HC4514	~~1.79~~	1.09
74HC163	~~.65~~	.39	74HC4538		.89
74HC174	~~.69~~	.49	74HC4543	~~1.19~~	.89

74HCT — CMOS TTL

74HCT00	~~.29~~	.17	74HCT139	~~.59~~	.35
74HCT02	~~.29~~	.17	74HCT157	~~.69~~	.35
74HCT04	~~.29~~	.17	74HCT174	~~.69~~	.35
74HCT08	~~.29~~	.17	74HCT175	~~.69~~	.39
74HCT10	~~.29~~	.17	74HCT240	~~.99~~	.89
74HCT32	~~.29~~	.21	74HCT244	~~.99~~	.59
74HCT74	~~.49~~	.25	74HCT245	~~1.19~~	.79
74HCT86	~~.49~~	.29	74HCT373	~~1.19~~	.55
74HCT138	~~.59~~	.35	74HCT374	~~1.19~~	.49

74C—CMOS

74C00	.29	74C174	.79
74C02	.29	74C175	.79
74C04	.29	74C221	1.79
74C08	.35	74C240	1.79
74C10	.35	74C244	1.79
74C14	.59	74C373	1.95
74C32	.35	74C374	1.95
74C74	.59	74C912	8.95
74C85	1.49	74C915	1.39
74C86	.35	74C920	6.95
74C89	5.49	74C921	6.95
74C90	.99	74C922	3.95
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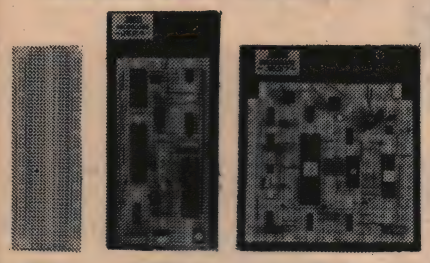


JE23 JE24 JE27

Part No.	Dim. L" x W"	Contact Points	Binding Posts	Price
JE20	6½ x ¾	200	0	$ 2.29
JE21	3¼ x 2⅛	400	0	$ 4.49
JE22	6½ x 1⅜	630	0	$ 5.95
JE23	6½ x 2⅛	830	0	$ 7.49
JE24	6½ x 3⅛	1,360	2	$14.95
JE25	6½ x 4¼	1,660	3	$22.95
JE26	6⅞ x 5¾	2,390	4	$27.95
JE27	7¼ x 7½	3,220	4	$37.95

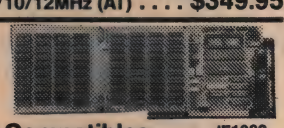
Jameco's IBM PC/XT/AT Compatible Motherboards

JE1001

- Award BIOS ROMs included

JE1001	4.77/8MHz (PC/XT)	$ 99.95
JE1002	4.77/10MHz (PC/XT)	$119.95
JE1007	6/8/10/12MHz (AT)	$349.95

2 & 3MB Memory Expansion Cards for IBM AT and Compatibles



JE1082

JE1081	2MB of expanded or extended memory (zero-K on-board) (AT)	$129.95
JE1082	3MB of expanded or extended memory, parallel printer port, serial port and game port (zero-K on-board) (AT)	$169.95

Jameco Computer Power Protection JE1190

JE1190	Power Base	$29.95
JE1191	6-Outlet Power Strip	$11.95

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Expand the memory of your Tandy 1000 (128K Version) to as much as 640K. Also includes DMA controller chip.

TE512 Includes 512K RAM. $199.95

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T30MB 30MB Hard Disk Drive Board. $599.95

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400042	NSC Linear Data Book-Vol.II (87)	$ 9.95
400043	NSC Linear Data Book-Vol.III (87)	$ 9.95
210830	Intel Memory Handbook (87)	$17.95
230843	Intel Microsystem Hndbk. Set (87)	$24.95

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FREE! Word Processing Software!/***New!*** Compact Case

IBM AT Compatible Kit Mini-286 6/8/10/12MHz Kit

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JE1017	Baby AT Flip-Top Case	$ 69.95
JE1022	5¼" Hi-Density Disk Drive	$109.95
JE1032	200 Watt Power Supply	$ 89.95
JE1043	360K/720K/1.2M Floppy Controller Card	$ 49.95
41256-120	512K RAM (18 Chips)	$161.10

Regular List $890.80

SAVE $140.85! JE1059 $499.95 (EGA Monitor and Card not included)

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JE286M JE1009 Technical Manual. $29.95

IBM COMPATIBLE DISPLAY MONITORS

12" Amber Monochrome — TTL Input, High Resolution (PC/XT/AT)

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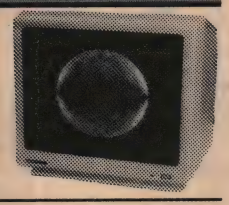
14" RGB Color — CGA Compatible Amber/Green/Color Switchable, 640 x 200 Resolution (PC/XT/AT) TTX1410

TTX1410. . . . . $279.95



14" EGA Color - EGA/CGA Compat., 720 x 350 (max.) resolution (PC/XT/AT)

TE5154. . . . . $399.95

14" Ultrascan Color — CGA/EGA/PGC/VGA Compatible, 800 x 560 (max.) Resolution (PC/XT/AT)

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IBM PC/XT/AT COMPATIBLE CARDS

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JE1050

JE1050	Mono Graphics Card w/Printer Port (PC/XT/AT)	$59.95
JE1052	Color Graphics Card w/Printer Port (PC/XT/AT)	$49.95
JE1055	EGA Card with 256K Video RAM (PC/XT/AT)	$149.95
JE1071	Multi I/O with Drive Controller and Mono Graphics (PC/XT)	$119.95

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JE1065	I/O Card with Serial, Game and Parallel Printer Port (AT)	$59.95
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JE1040	360KB Floppy Disk Drive Controller Card (PC/XT)	$29.95
JE1041	20/40MB Hard Disk Controller Card (PC/XT)	$79.95
JE1043	360K/720K/1.2MB Floppy Disk Cont. Card (PC/XT/AT)	$49.95
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Additional Add-Ons Available!

COMPUTER PERIPHERALS

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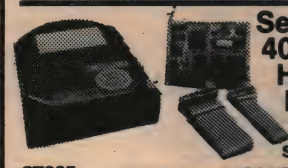

ST225K (Pictured)

ST225	20MB Drive only (PC/XT/AT)	$259.95
ST225K	20MB w/Controller (PC/XT)	$289.95
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ST238K	30MB w/Controller (PC/XT)	$329.95
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ST251XT	40MB w/Cont. Card (PC/XT)	$499.95
ST251AT	40MB w/Controller Card (AT)	$539.95
ST277	60MB Drive only (PC/XT/AT)	$549.95
ST277K	60MB w/Controller Card (AT)	$659.95

Jameco 5.25" PC/XT & AT Compatible Disk Drives

JE1022 (Pictured)

JE1020	360K Black Bzl. (PC/XT/AT)	$ 89.95
JE1021	360K Beige Bzl. (PC/XT/AT)	$ 89.95
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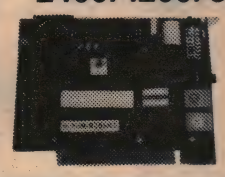
Toshiba 3.5" PC/XT/AT Compatible Disk Drive

352KU 3.5" 720KB (Bezels and Installation Kit incl.) (PC/XT/AT) . . . $129.95

2400/1200/300 Modems



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- Tests: AC/DC Voltage, Resistance and Continuity
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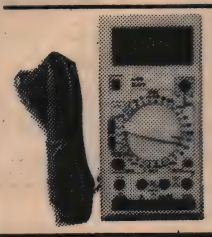

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For Sale Burroughs B 1800 main frame 6 terminals, dual 90 meg platter drives, included is a $10,000 Burroughs 220V & 110V filtered power supply complete business programs and operating system. Will deliver for right price. To make an offer call 806-353-6904 or write to **J.M. Mc Donald** PO Box 7404, Amarillo, Texas 79114.

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HP150B Touchscreen computer system. 15MB drive with floppy. Thinkjet and thermal printers. Modem. 640KB RAM and HPIL. Seventeen software applications including 1-2-3 (rev. 2.01), Wordstar, Graphics Gallery, Advancelink, Cardfile, project management, Lattice C, more. Excellent condition. $2500. **716-425-2497.** 04-101

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(148) DEC SYSTEMS FOR SALE

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HIGH Density	17.50	17.00 / 16.00

3½" S-Side 10.00 (3½") 3½" D-Side 15.95

S-Side D-Den. 19.95 (8") D-Side D-Den. 21.95

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Minimum Order $25.00 · Visa, MasterCard accepted · C.O.D. orders add $3.00 · Surface Shipping: on 3.5 or 5.25" add $3.00 per 100 disks. 8" add $4.00 per 100 disks. UPS delivery only. U.S. mail for APO, FPO, AK, HI or PR add an additional 5% for PAL. Prices subject to change without notice!

3M

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HIGH Den.	17.50	16.50 / 16.00

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3.5	DATA CARTRIDGES	8"
S-Side 11.95	DC 1000 12.95	S-Side S-Den. 15.40
D-Side 16.50	DC 2000 17.50	S-Side D-Den. 18.95
H-Den. 47.95	DC 300XLP 19.75	D-Side D-Den. 20.95
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SONY

Packaged 10 Per Box

	2 BOX	5 BOX	10 BOX
3½" Single Side	11.95	11.50	10.95
3½" Double Side	16.50	15.95	15.50
HIGH Density	42.95	41.95	39.95

SONY, without labels or box

Packaged in Fifties

MAC-PAC-50's	50	100	400
3½" Single Side	1.05 EA.	1.02 EA.	.99 EA.
3½" Double Side	1.29 EA.	1.25 EA.	1.19 EA.

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5¼"

RX 50 Format	S-Side 96 tpi	D-Side 96 tpi
13.95	12.95	13.50

8"

S-Side S-Den.	S-Side D-Den.	D-Side D-Den.
17.95	19.95	22.95

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Verbatim®

A Kodak Company

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3½" Diskettes

S-Side 11.95 D-Side 16.50 H-Den. 39.95

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S-Side S-Den. 15.40 S-Side D-Den. 17.95 D-Side D-Den. 20.95

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Nashua™

5¼" DOUBLE SIDE, DOUBLE DEN. 5 BOX 5.95

5.50 PER BOX MIN. 10 BOX

5¼" HIGH DENSITY	Packed 10 Per Box 2 box	5 box	10 box
	11.95	10.95	10.50

Nashua	Packed 10 Per Box 2 Box	5 Box	10 Box
3½" SINGLE SIDE	12.50	11.50	10.95
3½" DOUBLE SIDE	14.95	14.50	13.95

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qualimetric

5¼" D-Side	5¼" High Den.
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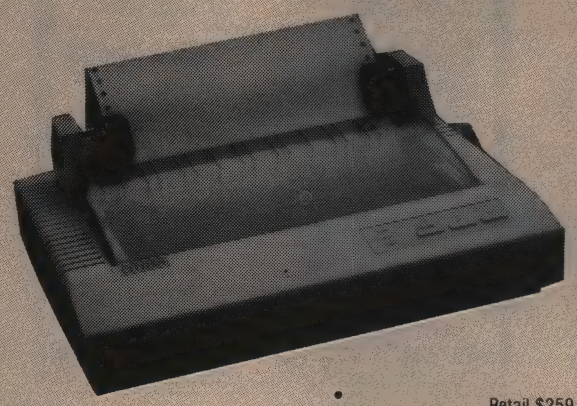

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For an easy-on-the-wallet solution to high quality, dependable printing, your best choice is the Citizen 120D.

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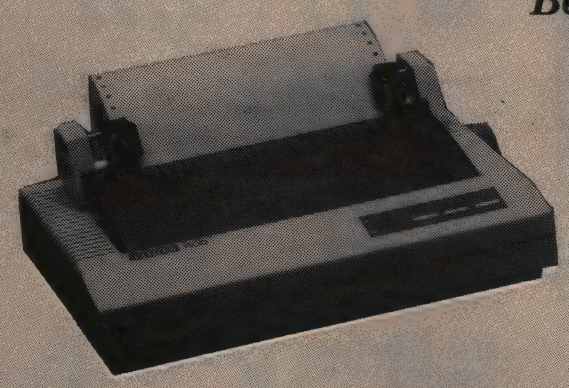
- 120 CPS Draft/25 CPS NLQ
- Both IBM and Epson Compatible
- Standard Parallel Interface
- 4K Print Buffer Enhances Productivity
- Both Bottom and Rear Paper Feed for Versatile Paper Handling
- Built-In Pull Tractor Maximizes Forms Handling
- Complete Graphics Capability
- Select Compressed, Expanded or Italic Characters From Front Panel
- Automatic Single Sheet Load
- One Year Manufacturer's Warranty



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The Citizen 180D is a fast, rugged printer that will make short work of your correspondence, reports and high resolution graphics.

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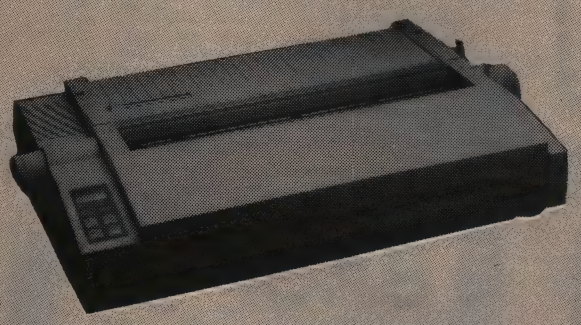
- Built-In Pull Tractor Maximizes Forms Handling
- Complete Graphics Capability
- Select Compressed, Expanded or Italic Characters From Front Panel
- Automatic Single Sheet Load
- One Year Manufacturer's Warranty



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MULTI-FONT PRINTER
NX-1000

is a versatile and reliable printer for home, school or office.

Your Price **$179** EVEN LESS!

Push Button Control of 20 Type Styles!

- Fast 144 CPS Draft/36 CPS NLQ (18/23 Character Matrix)
- Both IBM™ and Epson™ Compatible
- Generous 4K Buffer
- Standard Parallel Inteface
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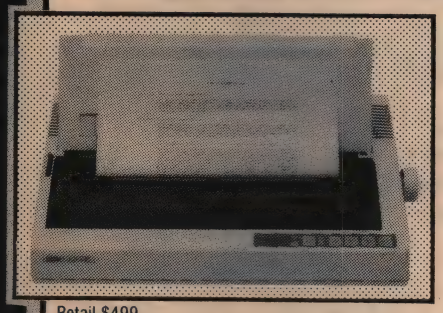
- Time Saving Paper Parking Feature (Feed single sheet without removing sprocket paper.)
- Easy-to-Use Membrane Control Panel
- Push Button Control of 20 Type Styles
- 1-Year Manufacturer's Warranty

NX-1000 Color (Prints 7 Colors) (Retail $379) $249

Retail $289



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$319 EVEN LESS!

The Star NX-15 gives you full front panel control in a 120 cps draft and 30 cps NLQ. You get great looking originals time after time with the hardworking NX-15.

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NX-10	120 CPS + NLQ, Epson/IBM Compatible	$349	~~$169~~
NX-10C	Commodore Compatible	349	~~179~~
NX-1000	NEW Multi-Font Selection, 144 CPS, 4K, Paper Parking	299	~~179~~
NX-1000C	Commodore Compatible	299	~~179~~
NX-1000CL	Prints 7 Colors	379	~~249~~
LV-1215	120 CPS, IBM Compatible, 136 Column	499	~~199~~
LV-1615	160 CPS, IBM Compatible, 16K, 136 Column	699	~~239~~
LV-2015	200 CPS, IBM Compatible, 16K, 136 Column	799	~~269~~
SD-10	160 CPS, IBM/Apple Comp., Parallel Interface	599	~~219~~
SD-15	160 CPS, IBM/Apple Comp., 15" Carriage	749	~~249~~
SR-10	200 CPS, IBM Compatible, Parallel Interface	679	~~239~~
SR-15	200 CPS, IBM Compatible, 15" Carriage	799	~~299~~
NX-15	120 CPS + NLQ, Epson/IBM Comp., 15" Carriage	529	~~319~~
NR-10	240 CPS, Epson/IBM Comp., 12.6K Print Buffer	579	~~339~~
NR-15	240 CPS, Epson/IBM Comp., 12.6K, 15" Carriage	799	~~469~~
NB24-10	24-Pin, 180 CPS, Epson/IBM Compatible, 8K	749	~~449~~
NB24-15	24-Pin, 180 CPS, Epson/IBM Comp., 15" Carriage	999	~~569~~
NB-15	24-Pin, 300 CPS + NLQ, Epson/IBM Comp., 15" Carriage	1399	~~649~~
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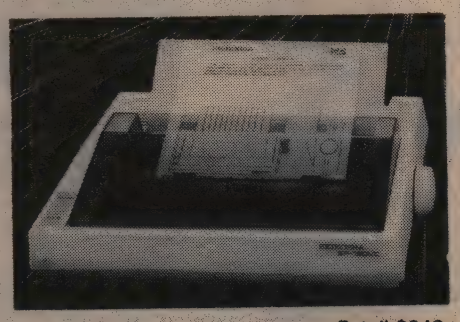

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2 FULL YEAR WARRANTY

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- Full Graphics Capability
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- 100 CPS (Draft) and 16 CPS (NLQ) Printing Speed
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- Low Noise Level Output Less Than 52 dBA
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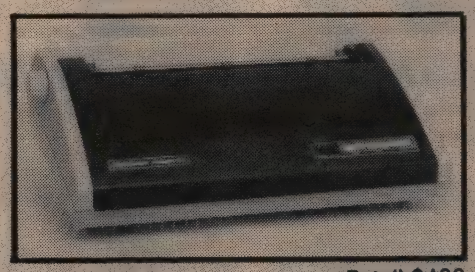
- Margin and Line Space Designation by Using Corresponding Commands.
- Original Plus 2 Copy Capacity

22 CPS Daisywheel

Alphapro 101

"Best Daisywheel Printer Buy Ever!"



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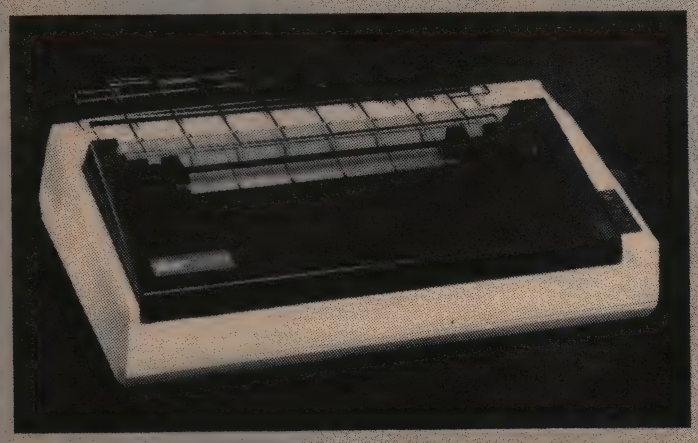

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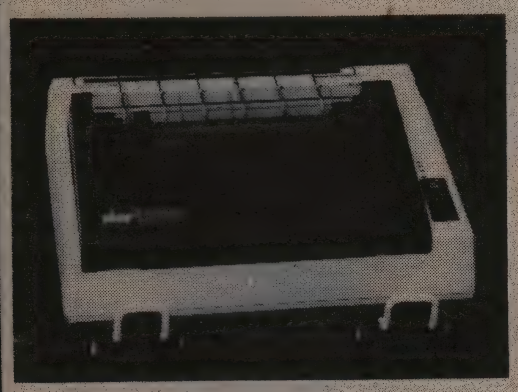

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NX-10C	Commodore Compatible	349	~~179~~
NX-1000	NEW Multi-Font Selection, 144 CPS, 4K, Paper Parking	299	~~179~~
NX-1000C	Commodore Compatible	299	~~179~~
NX-1000CL	Prints 7 Colors	379	~~249~~
LV-1215	120 CPS, IBM Compatible, 136 Column	499	~~199~~
LV-1615	160 CPS, IBM Compatible, 16K, 136 Column	699	~~239~~
LV-2015	200 CPS, IBM Compatible, 16K, 136 Column	799	~~299~~
SD-10	160 CPS, IBM/Apple Comp., Parallel Interface	599	~~219~~
SD-15	160 CPS, IBM/Apple Comp., 15" Carriage	749	~~249~~
SR-10	200 CPS, IBM Compatible, Parallel Interface	679	~~229~~
SR-15	200 CPS, IBM Compatible, 15" Carriage	799	~~299~~
NX-15	120 CPS + NLQ, Epson/IBM Comp., 15" Carriage	529	~~319~~
NR-10	240 CPS, Epson/IBM Comp., 12.6K Print Buffer	579	~~389~~
NR-15	240 CPS, Epson/IBM Comp., 12.6K, 15" Carriage	799	~~439~~
NB24-10	24-Pin, 180 CPS, Epson/IBM Compatible, 8K	749	~~449~~
NB24-15	24-Pin, 180 CPS, Epson/IBM Comp., 15" Carriage	999	~~589~~
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We are proud to offer the technologically superior Packard Bell phone modems. Each Packard Bell modem transmits error-free data while providing consistently reliable performance. Packard Bell modems are the result of a 25-year commitment to telecommunications quality and performance. Packard Bell modems are fully Hayes and IBM compatible and carry a two-year warranty. To save you time and money, it's important to transmit accurate information quickly.

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Sincerely,
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President

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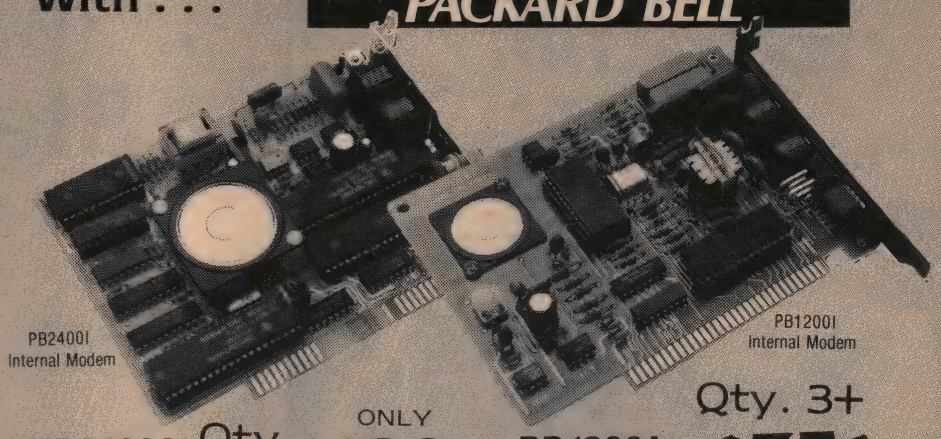

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- 2 year warranty

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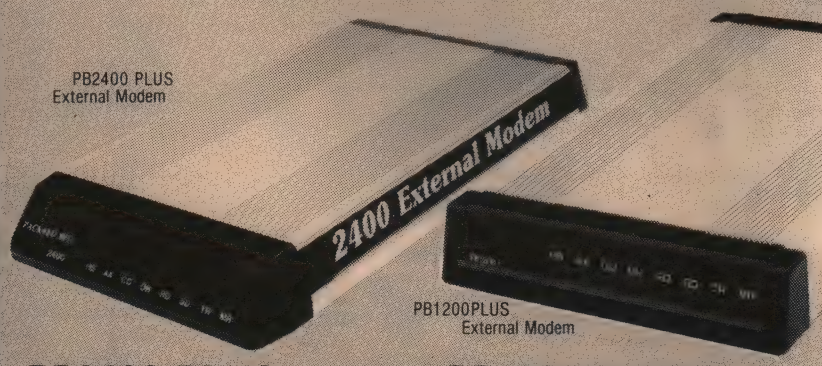

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- 2 year warranty

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- Fully Hayes™ compatible
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- Auto-dial, auto answer
- Auto tone or pulse dialing
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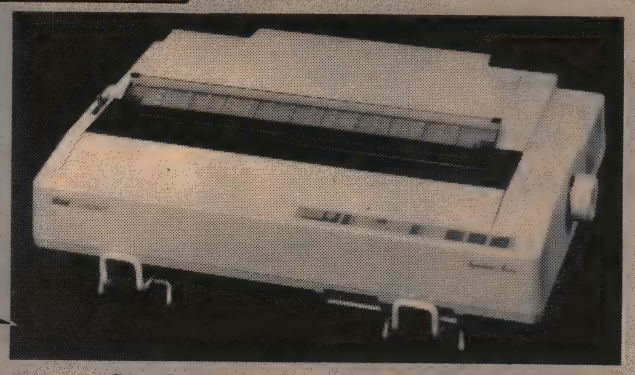

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LV-1615	160 CPS, IBM Compatible, 16K, 136 Column	699	~~239~~
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The remarkably easy-to-use LX-800 printer can handle virtually any task. For instance, you can print "hard copies" of business letters, bulletins, newsletters and flyers . . . and on your own stationery, if you like. It is ideal for student term papers and reports. Or for your home use, print out your monthly budget, a list of bills to be paid, your shopping list or personal correspondence. The LX-800 printer by Epson is one of the most reliable, full-featured printers on the market today.

- 180 CPS Draft/30 CPS NLQ
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- Parallel Interface Standard
- Both Friction and Pull Tractor
- SelecType Front Control Panel
- Two Resident Fonts – Roman or Sans Serif
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- 1 Year Manufacturer's Warranty

NEW EPSON LQ-500

24-Pin Letter Quality Text With
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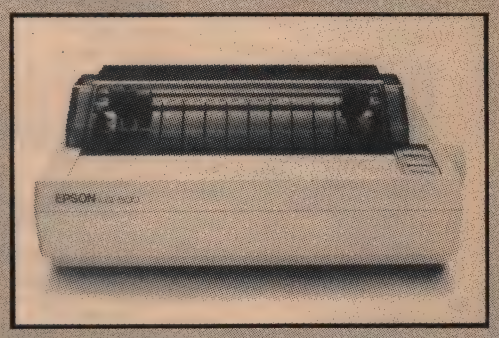

The New Epson LQ-500 24-pin printer is at home wherever letter quality printing is required, including the expanding world of desktop publishing. The LQ-500's new "Shadow" and "Outline" print modes allow you to create special effects for headlines, etc. The outstanding features of the LQ-500 include high-resolution text and graphics, high-speed operation, and the versatility to handle a variety of paper and forms with the utmost efficiency, from tractor-pulled fanfold paper to the automatic loading of single sheet letterhead. It is the ideal printer for student and home use, as well as the demanding applications of small business.

- 24-Pin Letter Quality Printing
- 180 CPS Draft/60 CPS LQ
- Generous 8K Print Buffer
- Parallel Interface Standard
- Both Friction and Pull Tractor
- Automatic Single Sheet Loading
- One Year Manufacturer's Warranty
- Two Built-in LQ Fonts – Roman & Sans Serif
- SelecType Control Panel for Convenient Selection of Draft/LQ Modes, Font Selection
- NEW "Shadow" and "Outline" Print Modes
- Compatible With Most Popular Software Including PageMaker™

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Quantity 3+ $CALL

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FX-286e	240 cps, Wide Carriage, Epson/IBM Compatible	799	$CALL$
EX-800	300 cps, NLQ, Color Option	649	$CALL$
EX-1000	300 cps, Wide Carriage	899	$CALL$
LQ-800	180 cps, 24-Pin, Epson/IBM/Diablo Compatible	599	$CALL$
LQ-1000	180 cps, 24-Pin, Wide Carriage	999	$CALL$
LQ-2500	405 cps, 24-Pin, Wide Carriage, Color Option	1449	$CALL$

Printer Accessories		Retail	Your Price
EX-800	Sheet Feed	$199	$CALL$
EX-800/1000	Color Module	79	$CALL$
EX-800/1000	Scanner	299	$CALL$
LQ-800	Tractor Feed	59	$CALL$
LQ-800/FX-86e	Sheet Feed	169	$CALL$
LQ-1000	Tractor Feed	69	$CALL$
LQ-1000/FX-286e	Sheet Feed	229	$CALL$
LQ-2500/EX-1000	Single Bin Sheet Feed	249	$CALL$
LQ-2500	Dual Bin Sheet Feed	399	$CALL$

Quantity 3+ $CALL$

Printer Accessories		Retail	Your Price
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LQ-2500	Scanner	299	$CALL$
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LX-86, LX-800, LX-86e/286e	Serial I/F Board, 2K	59	$CALL$
LX-86, LX-800, LX-86e/286e	Parallel I/F Board, 32K	175	$CALL$
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- Auto Paper Loading
- 1 Full Year Warranty

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$359
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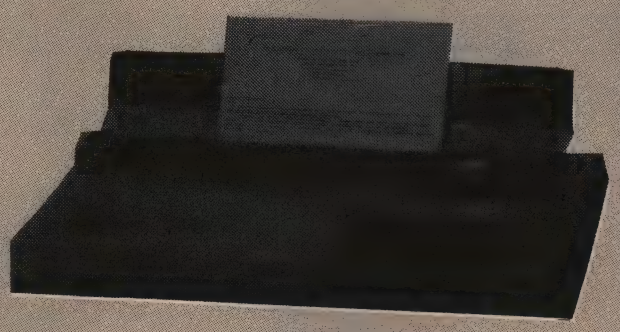
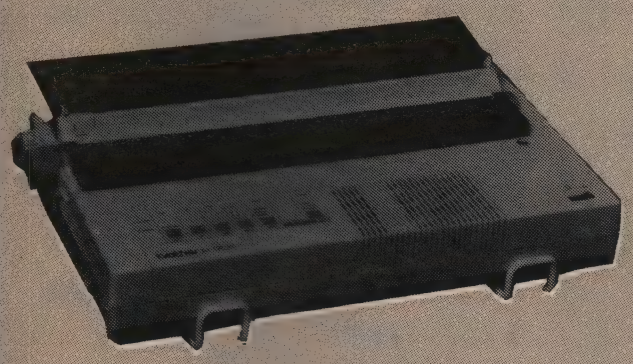


Retail $599

"Easy To Use, High Performance Business Printer"

Brother M-1709



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For streamlined printing efficiency of your critical correspondence, spreadsheets and graphic presentations, the Brother M-1709 is superior to any printer in its class.

- High Speed Output (240 cps in Elite, 200 cps in Pica)
- Bold Printing (33 cps, 3-Pass)
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- Paper Parking
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Brother's new 24-pin, wide carriage printer offers true letter quality printing for all your business printing. It features "paper parking" and easy front panel controls.

- High Speed Output – 216 cps Draft / 72 cps LQ
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- 15.5" Wide Carriage
- IBM, Epson, Diablo Compatible
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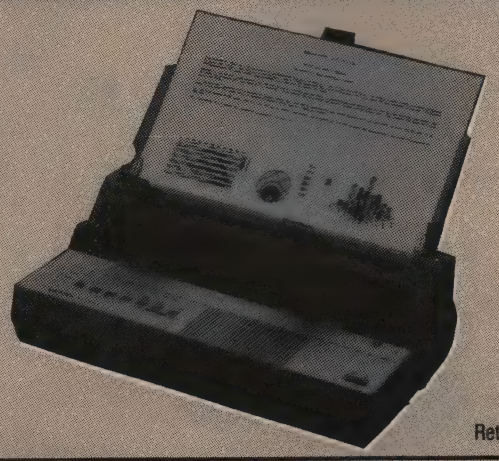

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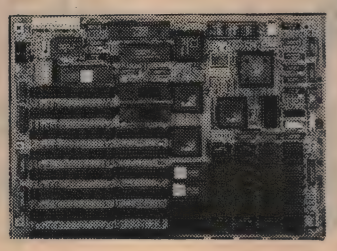

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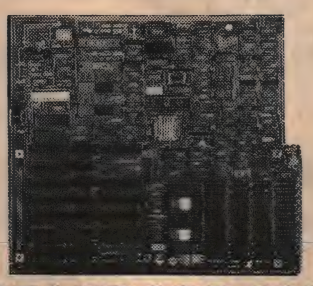
- 80286-10 CPU
- Phoenix Bios

10 MHz Zero Wait State $325

12 MHz Zero Wait State $365



STANDARD 286 MAINBOARD

- 80286-10 CPU
- Phoenix Bios

10 MHz Zero Wait State $355

12 MHz Zero Wait State $385

10 MHz MULTI TURBO MAINBOARD

- 8088-1 CPU
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- Phoenix Bios
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ACM-8031 ..... $125

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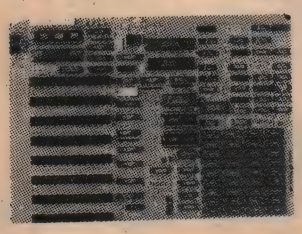
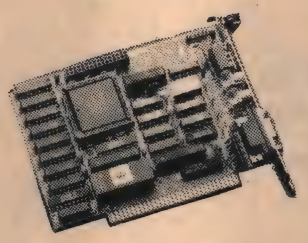


10 MHz TURBO MAINBOARD

- 8088-1 (V20) CPU
- Zero Wait State
- Phoenix Bios
- On Board Memory expands to 1 MB

ACM-8030 ..... $105



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Two From Mountain continued from page 392

of the screen for each aircraft. If you dive to 00000 you will crash. The maximum altitude is just over 44000 feet. There is a control/tactical panel beneath each window that shows enemy position relative to yours, thrust, cannon temperature, aircraft attitude, etc. The panel is quite well done and is easy to read.

The Fight

The center of your cockpit window is the aim point for your weapons. You select weapons from the keyboard by pressing (for the left player) "Q" and for the right player the "up arrow" key. If you see a cross hair then the cannon is selected. A rectangle is for missiles and if nothing is there you have selected flares. Flares are useful for evading enemy missiles but must be fired at just the right time. The cannon is good as a short range weapon. Most of the time, a missile will do the job nicely. If you fire the cannon too long, it will overheat and jam. Remember to watch the cannon temp guage. Play continues until someone gets shot down. When that happens, a screen comes up showing the current men you have left, level of play, etc. In the single player mode, the game becomes more difficult as the play level increases.

Fixed Flying

This game is not a true flight simulator. For instance, you cannot stall the aircraft. If you slow down (decrease thrust) to zero, your plane will just stay where it is. This is a good idea if you and your partner want to take a break from the fighting. This will not work in the single player mode because you cannot control the aircraft the computer is flying and you will get shot down.

Final Word

Top Gun seems on the surface to be too simple. The graphics for explosions certainly are. While it is billed as being for ages 10 and up, the older set may find it entertaining if they have the patience to stick with it and become more involved in the game. The music is very well done and is almost worth $12.95 to listen to the entire score.

The Second Game

Slot Car Racer comes attractively packaged showing a fast race car on the front of the box and good screen shots on the back. This game includes split screen viewing, two player option and the ability to design your own track which can be saved to a separate disk.

The Race Begins

My first surprise came when I loaded the program. It took only 30 seconds to load! But was this a good sign or bad? After all, how complete can a game be that loads from a 1541 drive in less than a minute? When the load is finished, you must work your way through several options before you can race. In fact, you must go through the options after every race. This can be annoying for repeated one lap races. But lets get back to the point. In the options screen, which comes up first, the first task is to enter the names of the racers. Type your name at Player 1 and press return. If only one person is to play, press return at Player 2 without typing in a name. With two players, enter a second name. Next, each player will be asked if he has a joystick. If he does, press Y, if not press N. Now, you will be asked if you want to design a track. If you press Y, you will go to the track design part of the program, N will send you to the Load Track option. This is only for those who have designed a track and saved it on a disk. Once past the load option, you are asked to choose from one of 17 international tracks built into the program. Each track outline is drawn in the lower right quarter of the screen with it's name just above it. In a box above that, an "Accept Yes No" message appears. If you want to race on that particular track, press "Y," if not hit "N." If you press "N" the next track will be drawn. There are 17 tracks in all so it could take a while to get a specific track. There is no way around this, except for designing a track you like with the design portion of the program, and saving it to disk where you could load it by name. Each time you reject a track, the next one will come up. When you do accept a track, you still must press F5 to race. When F5 is pressed, you will be asked two more things. First, how many laps do you want and second, if you are playing against the computer, opposition quality. Laps may be set from one to 99. A quality setting of one is rookie while three is expert. When all is done, the screen changes to the actual race screen. The race screen is split, with player one in the red car in the lower part of the screen, and player two in the yellow car in the top part of the screen. In the lower left of the screen will be a red map for player one and to the right a yellow map for player two. In both car views will be a man waiting to drop

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More Timex Sinclair

by Michael O'Brien

Revel Without A Cause

Not one to get easily excited over new developments, there have been some fairly significant gains made in hardware/software product developments. Particularly for the TS/1000, Sinclair and Amstrad computers.

Although things are beginning to change, most of these developments continue to come from abroad; primarily Europe. And again I will mention, that this article will originate from London for two months this summer. The primary focus will be on new product developments for the Timex, Sinclair, Cambridge and Amstrad computers.

I am arranging for interviews with Sir Clive (Cambridge Computers), and Alan Sugar (Amstrad). Please drop me a line now, and include three pertinent questions that you would ask either, or both of these pioneers. This is a rare forum for you to personally interface with the people that made it all happen.

The "Rammy" Awards

I was pleased to see an increasing number of new, quality products available for the Spectrum. Although it has often been called a "games machine," there are indications that software developers are leaning towards more useful packages. Take for instance new word processing packages that offer word processing, datafile, mailmerge, financial calculator, 40/48/60/80 column screens, up to 148 characters per line, micro drive conversion and 16 redefinable key facility.

The Spectrum, or Spectrum emulated TS/2068 is now compatible with light pen interfaces, 2 button mouse, MIDI interfaces, sound samplers and a host of printer/disk interfaces. Other new products offer the capability to load 48K programs from 3.5 or 5¼" disks in just 3½ seconds. Up to 780K storage capacity and a snapshot feature all at near bargain prices from abroad.

Three cheers for software designers utilizing digitized video interfaces to produce stunning, near high resolution graphics. The actual technique is to use a video camera, via a digitized video interface to capture, digitize and then enhance (if necessary) video reproduc-

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the flag. Push your joystick forward to rev up the engine to speed and wait for the flag to drop. When the flag drops, press the "fire" button to start your car moving. Push the joystick left or right to cause your car to move left or right. Pulling back on the joystick will cause your car to apply it's breaks and downshift. When you go through a curve, centrifugal force will cause your car to drift to the outside of the turn. You may stop or slow the drift by breaking. If you hit the grass on the side of the roadway, your speed will be forced down to 50 miles per hour or less. The sound in the race is good. You can hear cars shifting up and down, skidding and both engine sounds at the same time. Graphics are excellent. The road turns, the background scrolls smoothly, and the white line down the middle of the road is reflected on the rear of the cars when they pass over it. Not bad! The game can be stopped any time by pressing the F3 key. At any rate, the game is over when someone completes all laps first or when there is a crash. Lap times are also shown on the maps for each driver.

Design Your Own

Designing a custom track is pretty easy. The upper right portion of the screen contains fifteen track parts and a large arrow. Before a track can be designed, you must decide if you want a vertical or horizontal track. First use the arrow keys on the keyboard to move the crosshair to the starting position you want and then press V for vertical or H for horizontal. A straight starting piece will be put on the screen for you. Now use your joystick to move the large "select" arrow at upper right over the piece you want to add to your track and press the "fire" button. The piece will be added to your track. To back up in the process, press the F3 function key. This will erase the piece and back up one place. Note that for each press of the F3 key, the entire track is redrawn. If your track is a long one, it can take a while before you can continue with track design. Chicanes are supported. A chicane is a section of track where only one car can get through at a time. If you add a chicane piece, it can only be added to another chicane piece. The exception to this is the IN/OUT chicane piece. It must be used to start or end a chicane run. To complete a track, it must finish straight and return to the starting piece. It may overlap or be a tiny bit out of alignment. When you have the last piece in place press F7 to CLOSE the track. If the computer cannot close your track, you will have to remove one or more pieces and try again. (Hint: sometimes a track can be closed if the last piece was a short one and you delete it and try close (F7) again.) When you have closed your track, you will be asked if you want to save it. If it is to be saved, you must provide a disk for that purpose. The disk must be one that is formatted and does not have anything else of importance on it. Do Not save a track to the game disk or any other important disk!

Our Conclusion

We have learned that price does not tell you anything about game quality. I would rate Top Gun as being "fair," while our second program, Slot Car Racer is excellent. I have seen programs costing much more, and not worth the price paid. By the way, the answer to the question about how complete can a game be that loads in less than a minute is: VERY! Have fun! ●

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More Timex Sinclair continued from page 466

tions. Although this technology has been around a short while, it is being taken to the limits, and being utilized extensively for our computers. I applaud the ingenuity.

I wish I had a dime for every time someone looked at my Timex computer and said "Gee, that is cute," or "Is that a real computer?" I recently spent an entire weekend at my TS/2068 as an experiment. By using nothing more than the computer and a modem I was able to purchase and have all of my food delivered to my door, make stock transactions, travel arrangements for my trip to Europe and a cruise, even have my front sidewalk shoveled. The results of my weekend experiment will be published in an upcoming article. Proving once again—these are powerful computers.

My daily job as a television producer/director allows me the opportunity to expand the use of my TS & Amstrad computers. Oddly enough, in this week's mailbag comes a suggestion for something along those lines. Robert Lafara of Indianapolis writes about how he has adapted his TS/1000 to allow video titles to be transferred to videotape. Known as character generation, here is the procedure. By hooking up the RF output of the TS/1000, key in this two line program:

10 PRINT AT 8,6;"TITLE OF TV PROGRAM"

20 print at 13,11; "mm/dd/yy"

Obviously, the x,y coordinates can be varied to suit your needs, or other information can be added. If you have a ZX80 or other computer without the "AT" capability, you can add extra lines of code to print blank lines and insert leading spaces to a title to position it properly.

Reviews

(Lights...Camera...Standby. 3-2-1.) "Hello, this is Michael O'Brien, here with an unpaid, unsolicited remark on behalf of Lemke Software development. In these days when others revel in the uncertainty of the future of our computers, we need all the friends we can muster. Upon reviewing yet another Lemke product, I still feel that Stan Lemke is among the finest software programmers in this country for the TS/2068. His latest endeavor is an upgrade of Pixel Print-The Desktop Publisher. Anyway the point is, if you never purchase a Lemke product, drop Stan a line to let him know how much you appreciate his fine work. Believe me, without your support we have all seen software developers come and go, and I feel that we need people of his caliber constantly challenging himself and us." (Fade to black)...Lemke Software, 2144 White Oak, Wichita, KS 67207.

Gail Howard has designed a new program for the TS/2068 that is causing a bit of a stir. LOTTO USA is an acclaimed percentage and wheeling system that offers better odds for those with a state lottery. The program touts a 500% winning edge, and utilizes the same system that Tom Mayer and the Diehards used to win the biggest jackpot in the New York state Lotto40.

The program is well designed, offering seven complete wheeling systems. This offers you the opportunity to make selections based upon historical data (that you must enter), or a random number generator that does not make use of the RND function. The program is available either as a fast compiled version, or a basic listable one that operates completely (but slower). Both versions output data to printer, are menu driven and arrive with documentation. Although I enjoyed the program, it is a bit too soon to offer an opinion on how well it works, unless I win, and you will be the second to know (my accountant is first). LOTTO USA for the TS/2068 is available from Knighted Computers, 10 Canalview Mall, Fulton, NY 13069.

Amstrad

While owners of the newer MSDOS Amstrads are reveling at the power of their computers (and rightfully so), and the availability of software, I still receive letters from people asking about software for the PCW-8256. This CP/M based computer has little available here in the states, and an abundance in Europe where it was developed. Often, the entrepreneur in me suggests acting as an agent, to bring this glut of software to this country. I am soon reminded (by my wife) of the inventory and shipping costs associated with the venture. Hmmmmmmm...maybe someday. My articles from Europe this summer will also focus on current availability of Amstrad PCW-8256 software.

Most everyone is familiar with the "Life." It was developed by a group of mathematicians a number of years ago as a diversion. It has become fairly common—if not tradition—for operators to hide the game in operating systems. The PCW-8256 has one such file already hidden in the Locoscript files on Side one of the system disks. Life is hidden in the Mail232.com files, and to run it boot up CP/M, then put your Locoscript disk in the drive. Type Mail232 (Return). Move the cursor to the "make ASCII file" option and hold down the extra key and press P. Now, except for the cursor, the screen will go blank. Here is where you set up your initial bacterium pattern. Using the cursor to move around, press the return key when you want to place a bacterium at the cursor position. When you are ready, press the space bar and the generations will roll by before your eyes. To end the process, simply press space bar again. For those of you not familiar with Life, read on.

The rules are simple. Think of a colony of bacteria that grow and change as generations go by. Any bacteria with two or three "neighbors" will survive into the next generation. Those with fewer than two neighbors will die. However, if it has more than three neighbors it will die from overcrowding. The object is to start with a pattern which will continue to thrive.

Back when you first began plowing through the PCW-8256 documentation, you undoubtedly learned about file password protection. Now, months later you may be faced with the following dilemma. You have disks with read pro-

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Unix
continued from page 245

physically logged into them on my console screen.

Okay, this all sounds fine, but what does this have to do with the great CPU MHz race? Plenty. Under Unix a new holy grail is shinning off in the azure seas of power and more power. This new shibboleth is called RISC, which is a fancy piece of icing for the RISC pastry shop of tempting electronic sweets.

What Is RISC?

RISC stands for "reduced instruction set computer" which basically means that the machine has hardwired instructions in firmware via Programmable Array Logic chips or PALS. Programs are more dependent on the CPU registers than on system memory. The general philosophy is that accessing CPU registers is faster than accessing system memory, which, in turn, is faster than going out to disk (swapping). Instead of extending the processing of zillions of instructions over several CPU cycles, RISC lets the binary results of an optimizing compiler execute a "select few" in just one cycle. Isn't this a good thing? Well, owning a Cray supercomputer is maybe a good thing, but do you really need it to get the job done? Furthermore, RISC architecture requires the optimizing compiler to take advantage of RISC. Some nefarious benchmark tests have shown that a RISC machine rated at 10 million instructions per second (MIPS) actually runs slower than a 4 MIPS non-RISC machine, perhaps because the test code has not been tailored to take advantage of the new (and quite different) RISC way of processing instruction sets.

Let's not delve too deeply into just what RISC is all about, but rather let's stick with our original premise, namely, is it necessarily wonderful to have 10 MIPS (notice we have switched from saying MegaHertz to saying million of instructions per second—a much headier concept)? For many years the unchallenged yardstick was the VAX 780, said to be a 1 MIPS machine. Actually recent research has shown that a VAX 780 is really more like a .5 MIPS machine. Makers of souped-up 386 desktop workstations claim that their 20MHz machines are 4 MIPS brutes.

CPU Power Is Sexy But Does Not A Marriage Make

Honeymoons eventually give way to the realities of the nitty gritty of cleaning house, washing the laundry, paying bills, and perhaps raising kids. A 20MHz 386 CPU may whiz through some things, but what about the hard disk, the video controller, the buss bandwidth, the ability of programs to function reliably, and the longevity of the machine laboring away 24 hours a day for 5 to 10 years?

What does make a machine useful? First of all, the user-interface must be reasonably easy to master. This does not necessarily mean that it is cute or arty or fun. Icon-based interfaces (GEM and MAC) are easy to work with if you are a casual user who does not want to be bothered with more than a few commands. Or you may only want to use applications software to accomplish what the operating system of more mature environments, such as Unix, manage to do with built-in utilities. For example, there are all kinds of MSDOS

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Ask Dr. John
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recommended, I can only think of one more thing that might be wrong with your setup. If you look at the motherboard in your computer (the one that has sockets to hold all of the other boards) you will find a set of dip switches. The switches are grouped into a single package that is roughly the size of one of the smaller integrated circuits in the board and are numbered 1 through 8.

These switches set the system configuration which controls functions such as:

Memory size
Coprocessor operation
Display type
Number of floppy diskettes

In some cases, when a monochrome board is installed, the computer manufacturer and/or dealer will set up these switches for monochrome mode (switches 5 and 6 OFF). To operate in color emulation mode, you'll need to set switch 5 ON and 6 OFF.

By the way, just in case you ever need to set up any of the other functions in your computer, here are the other switch settings:

Switch 1: Always OFF

Switch 2 ON: System will not recognize an 8087 coprocessor.

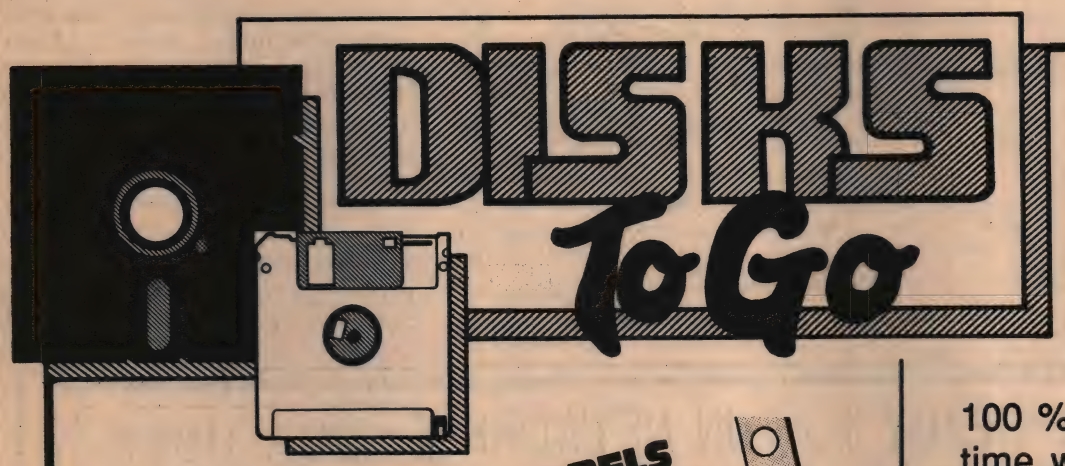
Switch 2 OFF: System will recognize an 8087 coprocessor.

Switches 3 and 4: (Memory size)
128K memory: 3 OFF 4 ON
192K memory: 3 ON 4 OFF
256K memory: 3 OFF 4 OFF
512K memory: 3 OFF 4 ON
576K memory: 3 ON 4 OFF
640K memory: 3 OFF 4 OFF

Switches 5 and 6: (Display type)
EGA: 5 ON 6 ON
CGA (40x20 mode): 5 OFF 6 ON
CGA (80x20 mode): 5 ON 6 OFF
Monochrome: 5 OFF 6 OFF

Switches 7 and 8: (Number of floppy drives)
1 drive 7 ON 8 ON
2 drives 7 OFF 8 ON
3 drives 7 ON 8 OFF
4 drives 7 OFF 8 OFF

Got a question about computers? Send your questions on any computer related topic to: Ask Dr. John, P.O. Box 20102, Castro Valley, CA 94546. ●



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Bible Search
continued from page 247

time. There are six menus on the window program with a total of 29 options.

The same care must be taken as with any memory program to see that it does not interfere with other programs in memory.

Clipboard is one of the features of the window program. It produces a large window at the right of the screen on which you can create a list of references, place verses, rearrange them, send them to a word processor, or compare with another version of the Bible.

The default size of the clipboard is 3K or approximately 15 to 20 verses. As copy is entered into the clipboard, a box at the top shows the percent of space used. The capacity of the clipboard can be increased to 10K, if desired.

```
c o m p u B I B L E          Scripture Section  1.3
Goto  Index  Transfer  Load  Next  Match  Window  Switch  Range  Quit
Goto Verse Reference

[GENESIS 1:1          ]═══════════════[Range: GEN 1:1 to REV 22:21 ]═══
   1 In the beginning God created the heaven and the earth.
   2 And the earth was without form, and void; and darkness (was) upon the
     face of the deep. And the Spirit of God moved upon the face of the
     waters.
   3 And God said, Let there be light: and there was light.
   4 And God saw the light, that (it was) good: and God divided the light
     from the darkness.
   5 And God called the light Day, and the darkness he called Night. And the
     evening and the morning were the first day.
   6 And God said, Let there be a firmament in the midst of the waters, and
     let it divide the waters from the waters.
   7 And God made the firmament, and divided the waters which (were) under
     the firmament from the waters which (were) above the firmament: and it
     was so.
   8 And God called the firmament Heaven. And the evening and the morning
     were the second day.
   9 And God said, Let the waters under the Heaven be gathered together unto
F1: Help   F2: Directory   F3: Print   F4: Display   F5: Top   F6: Bottom
      compuBIBLE                                              WEEPING

      Index: WEEPING
      Title: This is a sample index for use in the SCRIPTURE section.
      Range: MATTHEW 1:1 to MATTHEW 28:20
      Subject -
       1. weeping
       2.
       3.
       4.
       5.

      MAT  2:18  In  Rama  was  there  a  voice heard, lamentation, and
      weeping, and great mourning, Rachel weeping for her children, and
      would not be comforted, because they are not.

      MAT  8:12  But the children of the kingdom shall be cast out into
      outer darkness: there shall be weeping and gnashing of teeth.

      MAT  22:13  Then said the king to the servants, Bind him hand and
      foot,  and take him away, and cast him into outer darkness; there
      shall be weeping and gnashing of teeth.

      MAT  24:51 And shall cut him asunder, and appoint him his portion
      with the hypocrites: there shall be weeping and gnashing of teeth.

      MAT  25:30  And  cast  ye  the  unprofitable  servant  into outer
      darkness: there shall be weeping and gnashing of teeth.

      compuBIBLE                                              WEEPING

      Index: WEEPING
      Title: This is a sample index for use in the SCRIPTURE section.
      Range: MATTHEW 1:1 to MATTHEW 28:20
      Subject -
       1. weeping
       2.
       3.
       4.
       5.

MAT 2:18    MAT 8:12    MAT 22:13    MAT 24:51    MAT 25:30
```

Hebrew And Greek Dictionaries

Another program offered by NASSCO is the dictionary of the original text from which the translations were made. However, it utilizes English letters instead of the Hebrew and Greek characters.

NASSCO, P.O. Box 5660, Borger, TX 79008-5660. CompuBIBLE program with text $249 (State KJV). NIV and others available.

Genesys Bible Window $99 (less if bought with CompuBIBLE); Greek-Hebrew dictionary $149. ●

MIDI Column
continued from page 246

Running Status is a way for instruments to say "Until I tell you otherwise, every piece of data you get from now on is the same type." Running Status is part of the MIDI spec on the receiving end of things and optional on the transmitting end.

Why are we telling you all this when we promised not to get into bits and bytes? Because it can cause a problem under certain circumstances, that's why! Let's say that Running Status is implemented in a master that's connected to a digital sampler that's acting as a slave. You change programs on the master keyboard and the master tells the slave "Here's a Program Change command on this channel and until I say otherwise, everything you get from now on will be a Program Change value even though I don't label it as such." So far, so good. You change programs again and the slave says "Mmm... you're not labeled, but Running Status is active and the last thing I got said you would be a Program Change command." We're still O.K.

Now you go to the sampler and tell it to load a sound from disk. While it's loading you innocently noodle around practicing some killer licks. Normally that would tell the slave "O.K., now everything you get will be a Note-On command until I tell you otherwise." Unfortunately, it's very likely that the sampler's microprocessor is completely swamped while it accesses the disk and it doesn't see the change to the new type of data. The disk load ends and you play some notes on the master, but no sound comes out of the sampler. That's because the slave never saw the change of status from Program Change to Note-On. It looks at the note value and says "You're not labeled but the last information I got said you would be Program Change data," so it tries to change programs instead of playing notes!

The immediate solution to this problem is to do something to change the status (like use the pitch bender) while the slave is not paying attention. The permanent solution is not to play a master that sends Running Status while a slave is tied up doing something heavy like loading a disk. It should also be noted that some masters now transmit a fresh Status Byte if it's not told to do anything for 3 seconds—which also overcomes the potential problem.

Congratulations...you've just made it through the dreaded MIDI Status Byte! Next month we'll investigate some of the other types of MIDI data besides notes. See you then! ●

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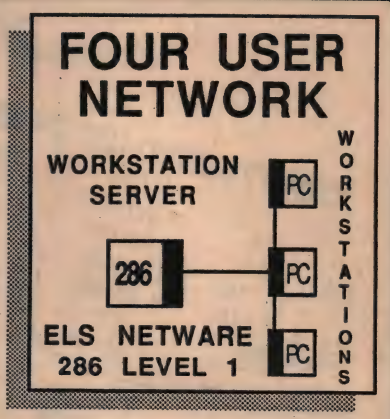

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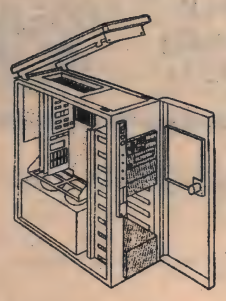

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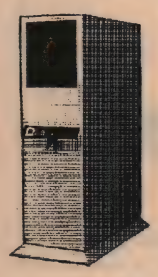

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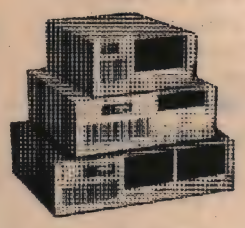

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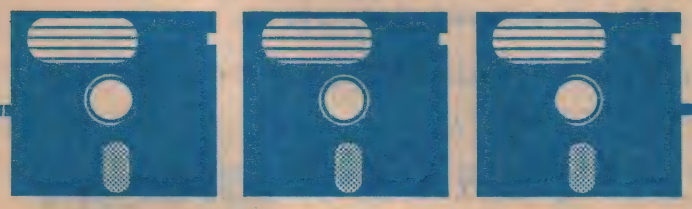

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QuickCode—The Programmers Library 8-bit Atari Software

Reviewed by Gary R. Ferris

It's not often that a new company can step in and make an immediate impact with a strong new software package, especially for a computer line that's been around as long as the Atari 8-bits. Stardust Software seems to have performed such a feat with QuickCode—The Programmers Library.

When I was first approached about QuickCode, I was quite frankly skeptical. I felt that it was probably too late in the game to be attempting to write and market a new programming language for the 8-bit line. When the review package arrived and I had a chance to experiment with it, I realized that this was going to be worth a much closer look.

The QuickCode package contains a double sided disk with the backside containing a great deal of additional documentation, which is not included in the impressive 66 page manual. QuickCode will work with any Atari XL/XE or 800 with at least 48K, one disk drive, and requires a Mac-65 assembler cartridge.

QuickCode almost became a nonstarter. About the same time QuickCode was introduced, OSS Inc. announced that they would no longer market or support their Mac-65 cartridge. Fortunately, ICD Inc. (makers of Spartados, the MIO Box, U.S. Doubler, etc.) purchased OSS and will now continue to market Mac-65 and all other OSS products.

For readers unfamiliar with Mac-65, the next section will be a short overview of the language and what it can do.

Mac-65 is what's known as an Editor/Assembler. The cartridge also includes an excellent debugging utility, called DDT.

Mac-65 is based on the Atari Editor/Assembler cartridge, but with many enhanced features.

The Editor is actually divided into two parts. The edit mode is the one which will normally be used as it provides error checking similar to that provided in Atari BASIC. The other mode available is the Textmode which provides no error checking, but can be used to edit nonassembler files.

The assembler allows you to write code in a form which is fairly easily understood by humans (ex. JMP $2000 means Jump to memory location $2000) which is then converted (assembled) into the true machine level code which is impossible to comprehend for the average person (the above example would read as, 4C 00 20 in machine code).

The Mac-65 Assembler is especially powerful in that it allows you to form macros. Forming a macro is literally like adding a new command to the language. If you have a routine which you are going to be using frequently, and do not wish to write the entire routine in each place it will be used, you can use the .MACRO directive to give the routine a name. Then in each place you wish to use the routine, you merely place the Macro name in the instruction field and the routine is automatically inserted at that point.

The DDT debugging utility allows you to actually view the program in operation. It allows you to set breakpoints (spots where the program will pause) which allows you to view the contents of variables and registers to see if the program is doing what it should. It also allows you to singlestep through a program which allows you to view the changes caused by each instruction. Singlestepping is most useful when you have narrowed the problem area to a small portion using the breakpoints.

Although not as easy to understand as a program written in BASIC, or other high-level language, assembly language can give an increase in execution speed of up to several hundred percent.

This brings us to the reason QuickCode was developed.

QuickCode is not actually a language. It is really a library of Mac-65 Macros, allowing you to write assembly language programs in a form which makes them nearly as easy to read and understand as a program written in BASIC or other high level language. In fact, many of the QuickCode macros have the same name as the BASIC function they replace.

Other macros which have no exact counterpart BASIC retain the same general structure. If you are a user of ACTION!, BASIC XL, or BASIC XE, then there are many commands you will recognize that are not in the regular Atari BASIC.

Macros must first be selected in a

continued on page 473

More Timex Sinclair
continued from page 468

tection, but you can no longer remember the passwords. Not to worry! Start up Locoscript, now remove Locoscript and insert the disk that contains the file(s). Press (F1). Create an empty file, select insert text from the (F7) menu, and select the CP/M file that you need to unprotect. After you have finished the edit, choose "make ASCII file" and create the file that CP/M can make sense of. This only works with text files, you cannot use it on a .COM file for example.

Here is another tip I use frequently. If you have made batch files for startup disks, and then simply want to boot the CP/M without waiting for all the file transfers, simply flick the write protect tab before inserting the start of the day disk. When it tries to boot the files it will cause an error statement. Choose C for cancel when prompted and off you go... ●

Quick-Code
continued from page 472

manner which the manual states may seem awkward at first. I still find it to be somewhat cumbersome, but it does get easier as you get used to it. You start with a file called FILE.HND which contains a list of all the macros with a semicolon in front of the macro name. This places them all in the comment field. To select a macro, you go to that line and delete the semicolon. Then you place the name of your source program at the end of FILE.HND in an .INCLUDE statement and save the modified FILE.HND to disk.

I will discuss mostly the Player/Missile Graphics macros and those used for Program Control or decision testing, as that is where I feel the power of QuickCode asserts itself most.

There are a large number of options available to you for condition testing and program control in QuickCode, each of which has their own specific advantages which gives you tremendous flexibility.

You have the familiar for/next and On/GoTo/GoSub. You also have a form of If/Then sequence which has the added power of the Else command. There are several variations of If, each specific for the type of variable you are testing. In addition, you have the Do/OD loop which is claimed to be as much as 30 times as fast as a For/Next loop. The Loop/EndLoop macro is claimed to be up to 50 times as fast as For/Next. The While/EndWhile loop will execute as long as a set condition is true. With the Case macro, you create two tables, one containing elements to be compared, and the other containing the point the program should jump to if a match is found.

There are also many Assembler type psuedo opcodes which test the status register such as JCC which will jump to the designated location if the Carry Flag is set.

Where QuickCode really shows its power is in its graphics routines. It allows you to work in any graphics mode, even those unaccessible from BASIC or the OS! It allows you to easily manipulate the Player/Missiles and allows you to put the movement routines in the VBI (Vertical Blanking Interval) or acces them as a subroutine. It also makes manipulating the Display List fairly easy.

The DL macro will change the OS pointer to your Display List and the DLI macro enables or disables Interrupts.

The VBI macro will turn a user defined VBI routine on or off.

The CHST macro allows you to have multiple character sets in memory and easily select which is active at any time. Assuming you have loaded a character set in page 110 (a page is 256 bytes), the QuickCode command would be CHST 110, in BASIC, the command needed is POKE 756,110.

A macro which goes hand in hand with CHST is the MVSET macro. This allows you to easily move the ROM character set to RAM where it can then be altered. The QuickCode command to move the ROM character set to page 110 of memory would be MVSET 110.

The code required in BASIC to perform the move would be:

```
10 CHBASE=110*256-1:REM New char set location
20 ROMSET=57344:REM Address of char set in ROM
30 FOR I=0 to 1023:REM Move 1024 bytes
40 POKE CHBASE+I,PEEK(ROMSET+I)
50 NEXT I
```

Additionally in BASIC, you must protect the area from being overwritten by BASIC's normal operation.

The HSCROLL/VSCROLL macros allow you to scroll the screen horizontally from 0 to 16 scan lines vertically.

There are several macros for collision testing:

Macro	Function
TMPFC	Test Missile PlayField Collision
TMPLC	Test Missile Player Collision
TPLPFC	Test Player PlayField Collision
TPLPLC	Test Player Player Collision

As you can see, the proper macro to use is easily determined. An example of the Missile/Player test is TMPLC 0,TEST. This example tests whether Missile 0 has collided and returns the value to the variable TEST. A collision with Player 0 sets bit 0, collision with player 1 sets bit 1, etc. This also allows testing for multiple collisions since each bit set means a collision with that player. In BASIC you need to know the address of the collision register for the particular Player or Missile you are testing for and PEEK that location.

The HITCLR macro will clear all collision registers. In BASIC you would POKE 53278,0.

The PRIORITY macro sets the level of priority for display of overlapping Players, Missiles, Playfields and Background. The OVERLAP macro determines whether the overlapped area

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is black or the two colors are ORed which will create a third color. In BASIC both functions are accomplished by POKEing 53275 with the appropriate value.

The PMCLR macro clears the upper 5/8 of the PM RAM which has the effect of removing the objects from the screen.

The PMGR macro initializes the Player/Missile graphics, sets Priority to 0, and determines whether the movement routine is installed in the VBI or accessed as a subroutine. The movement routine can be accessed as a subroutine even if installed in a VBI.

The PSIZE and MSIZE macros set the Player or Missile size. In BASIC you would POKE 53256 with the appropriate value.

The PMOVE and MMOVE macros will move a player or missile to a specific point on the screen.

Most of the DOS functions are available to you from your program with macros named for the function.

For example, to RENAME a file in QuickCode, you enter RENAME 1,"TESTFILE.SRC,NEWFILE.SRC." In BASIC, you have to use XIO 32,#1,0,0,"D:TESTFILE.SRC,NEWFILE.SRC."

Although QuickCode is definitely not for the Novice, I feel that anyone who has a reasonable grasp of BASIC, ACTION!, or other high level language could easily write programs in QuickCode without being Assembly Language experts. If you intend to write a program, which makes any significant use of the Atari's graphics capabilities, then I feel QuickCode is the logical choice.

For more information about QuickCode, contact: Stardust Software, P.O. Box 33192, Indianapolis, Indiana, 46203.

Mac-65 is now available from ICD/OSS, 1220 Rock Street, Rockford, Illinois, 61101-1437. ●

Note And Point

by John Nagy

8-Bit Atari News And Comments

More Atari news and rumors, gleaned from press releases, club newsletters, backroom chatter, and personal interviews with the people that should know.

Atari Corp. is reporting a good year of sales and profits for 1987, with a net operating income of 44 million dollars, up from 25 million in 1986. Computers made up 51% of total Atari sales (games, the remainder) and the losses still carried forward from prior years are now almost completely cancelled.

Unconfirmed rumors report that Atari may extend its warranty from the current 90 days on all equipment up to a full year! Although this would seem a boon to buyers, it might even worsen the almost adversarial position of dealers vs Atari. It is an expensive proposition to be an Atari repair center, and requires a commitment to fix anyone's machine, regardless of mail order or dealer bought. Adding 9 months to the warranty period, plus a "company policy" to assure 48 hour repairs on MEGA machines may well chase more of the already scarce dealer/service centers out of the market. Let's hope Atari can better their dealer relations.

Neil Harris is/has been the marketing information man at Atari for several years, and has patented the phrase "two weeks," used profusely to describe release dates of Atari announced products. Mr. Harris absorbs the brunt of most complaints (there are many) about Atari in general, and is faced with the not enviable job of running interference for a company whose announced intentions habitually run short of its abilities. Neil gets to tell us what is coming, and then tell us why it didn't come. Anyway, Neil has now taken on the job of East Coast and Midwest Sales Representative for Atari, leaving his duties as info man somewhat uncertain. He continues to do both, but that may change.

Many club newsletters and writers (me for one) have been critical of Neil and Atari for a long time, but now a number of columns have declared us "Atari Bashers" and defend the right of Atari Corp. to do whatever they please and to release or fail to release anything they want, whenever they want. Far be it from me to ever tell Atari what they must do, but I have a hard time swallowing the idea that users should not make their desires and frustrations known. Sure, we could all

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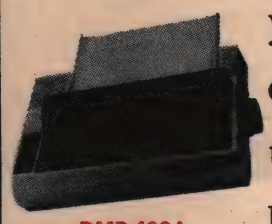

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buy an Amiga or Macintosh (or maybe an excercise bike?) and trash Atari altogether if we aren't satisfied, but we don't want to. We hope that our voice is heard and that our thoughts are considered. "Love it or leave it" mentality is just as out of place in business as it is in national pride. The facts are: Atari builds a great machine, and we want the best for it, for ourselves, and for the industry. If we ask for things, complain when crazy things happen, or moan when leading edge technology announcements age into trailing market hopefuls, I have no apology to make.

One of Neil Harris's employees is Sandy Austin, Atari User Group coordinator. Sandy and Neil have visited a jillion Atarifests by now, and many more are planned for 1988, despite earlier references to "closing the tent show." Sandy has promised at fest after fest that she will have another Atari Newsletter "soon," updating clubs on what is happening at Atari, including flat rate repair rates, exchange programs (did you even guess that you could trade in your 1027 printer for credit against a new XMM-something?). I heard the promise at the September Detroit Magic/Atarifest, and no newsletter yet. Maybe in two weeks. When I get more info, you can be sure you will have it next.

Atarifests continue to give user groups headaches, despite also being potential big money makers (the Detroit show mentioned earlier brought thousands of dollars profit for the clubs to divide). However, some clubs have this note to planners: a recurring theme in the post-mortems of Atarifests is the Hybrid Arts blues. Alan Glick of Jackintosh Bostin Users Group (J-BUG) reports that while overall profiting about $4,000 at their Atarifest, that Hybrid Arts has failed to pay nearly $1,000 for their two booths, ads, etc., despite more than four sets of invoices and many phone calls. Now, says Alan, H.A. even denies that they were at the fest! Hybrid Arts puts on a popular Midi-Maze game and offers nice prizes at Atarifests, let's hope they get it together before they become an outsider.

And more about club newsletters: more and more clubs are investing in bigger and better newsletters, and are cutting exchange lists down to conserve costs. Current Notes, out of the Washington D.C. area, outgrew the term newsletter quite a while ago—with about 80 pages a month, professional level layout and cover art, and a $3 cover price. Current Notes has notified (all?) their exchange list clubs that they will discontinue trading newsletters, and that the clubs should subscribe. Now a number of other clubs have followed suit and dropped their entire exchange program, seemingly regardless of the size or quality of their product. There are other options. The club I am affiliated with, Chaos of Lansing, Michigan, is a contributor club to *Michigan Atari Magazine*, another large-scale (40 + page) monthly, and the exchange list cost them nearly $100 every month. They are moving about two-thirds of their list to an every-other or every-third month rotation in order to not have to actually drop anyone, despite many of the trades being for a two-page "corner-stapel" letter. Let's hope that the rush to save a buck doesn't crush the amazing reprint network that has kept newsletters and club members across the country supplied with up-to-date and relevant material.

Keith Ledbetter (of Express! terminal program fame) has left ICD of Rockford, Illinois (makers of Spartados and many other outstanding Atari products). It is said that Keith went back to his old job in Virginia after direction frustrations at ICD and a decision by ICD to end development plans for Express! PRO BBS systems. Keith is apparently going to "go it alone" and continue Express! program development and sales privately. We wish the best of luck to Mr. Ledbetter, who single-handedly lead Atari telecommunications into the 20th century. I have no word yet as to how this affects the release date of the still-unavailable but Atari Funded Express! 212 for the new Atari 1200 baud modem, for use on an 8-bit computer without an expensive interface. (Reminder: several flavors of revised AMODEM terminal programs are available, and now a kludged handler, devised and circulated into the public domain by the Seattle-Puget Sound Atari Computer Enthusiasts (SPACE) club, will actually allow EXPRESS! 850 to be used with the SX212. Check your area BBS or club library.)

Meanwhile, ICD's Tom Harker is still saying that SPARTADOS X, the cartridge based, supercharged deluxe DOS, will be released soon, hopefully this spring or summer. Another version of Spartados a'la Disk is also in the works. Version 3.2D will be replaced with 3.5A—sometime. An owner update policy will be detailed when it is released. Now on deep stall at ICD: the 80 column card for the MIO. Now in permanent limbo: the multi-user MIO for networking a hard drive to 8-bit Ataris.

Another hardware item looking for software is the new 8-bit XF551 disk drive from Atari. Although it "supports" true double density and double sided read/write, its "ADOS," which was to be shipped with the new drives, is still not ready. Indeed, it may never be

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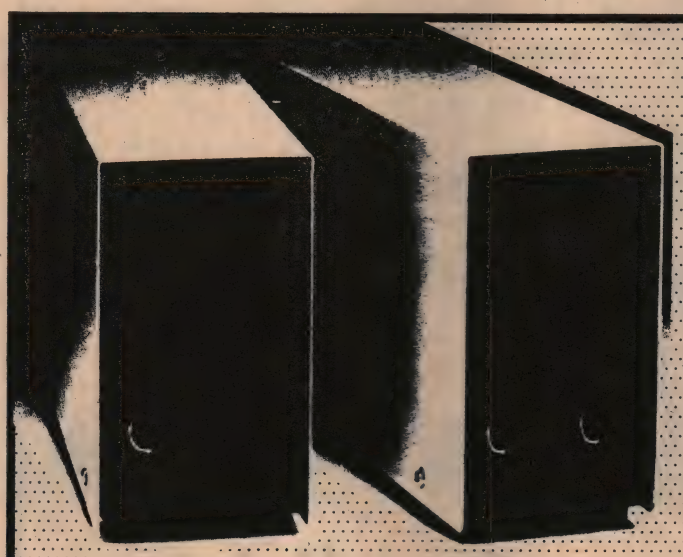

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Note And Point
continued from page 475

ready since the supposed developer, OSS Inc., merged into ICD Corp. ADOS is planned to be so very much like Spartados that certainly ICD won't have anything to do with it. But then, you really can't do better than Spartados, so why bother? The XF551 is currently available in some areas (mostly West Coast) for about $220, and comes with (snif!) DOS 2.5. Which of course means you can't access the best features of the drive. ADOS is said (only by some at Atari) to be scheduled for a later Public Domain release.

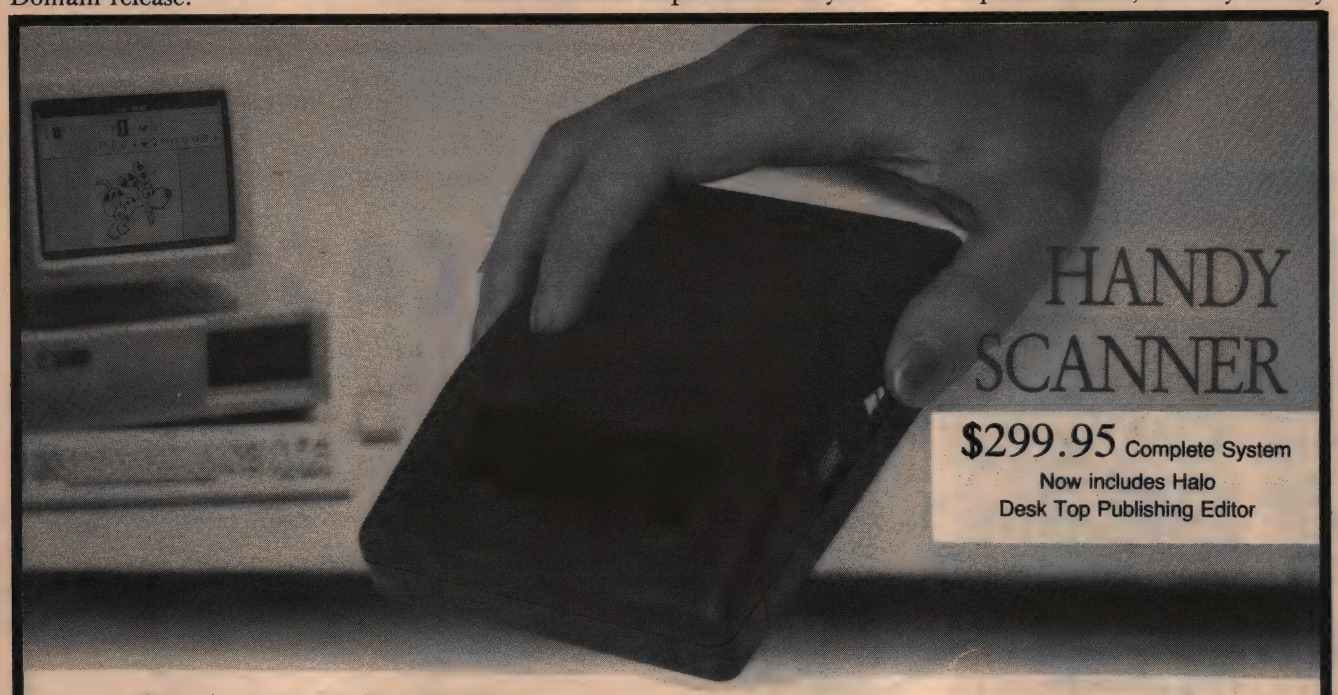
Mouse, Anyone? The Atari 8-bit line is without a mouse—but the Commodore Mouse designed for the C-64 and C-128 will work fine. Although the plug won't go into the recessed joystick ports on an XE (it will on an 800 or XL), you can use an extension cable and have good results. The 8-bit mouse (don't get the Amiga Mouse by accident!) can be found for sale far below the thirty-odd dollars retail—I bought one for $7 on a Sears clearance table. Although not hugely useful, the mouse will serve as a joystick-emulator without any additional software, and can make either dramatic improvement in your gaming aiming or totally confuse you, depending on the way the game handles. Unlike a "real" mouse which decodes actual position, speed, and direction, this one only reacts to direction and duration like a joystick. It handles fairly mouse-like nonetheless. I wish I had more machine-language resident handlers that I could slip into my applications (like my TextPro word processor) to allow me to use the mouse for positioning the cursor. These make the mouse actually useful instead of a curiosity. Several "graphic operating system" shells have been circulating in the public domain, and they are very much easier to operate with the mouse, but they still are no fun to me.

Trivia: It is said that Russ Wetmore wrote the Commodore version of Homepack using ACTION! language on his Atari computer.

Last month I mentioned Daisy Dot II, a new Public Domain package thats built on the already impressive printer program by Roy Goldman. To put it simply, Daisy Dot takes control of your Epson-type printer and delivers the closest thing to laser printer definition you will ever see from dots. Even the now dirt-cheap but capable Panasonic 1080 will make documents suitable for framing. Unlike the original Daisy Dot, this one is not written in Turbo-BASIC, but rather in C, which opens its use to 800 owners and Spartados users. Additionally, it now has the capability to manipulate Graphics, change fonts at any point (even mid word!) flush left, right, or center lines (really tricky in proportional fonts!), underline, proportional tabs even. Yike! And there is more. A 24 page manual, designed to be printed using Daisy Dot II, is a tour-de-force of the capabilities of the program, and a marvel to look through. And, yes, its Public Domain. I have over 20 fonts collected so far, and more are being made and traded on CompuServe and GEnie. It even comes with a great set of utilities to manipulate text or fonts. The only downside of Daisy Dot II is that, like the original, you must pre-format your text and print it to disk, as Daisy Dot can't deal with raw text data. Some word processors can't do this (like the original AtariWriter cart). And that 24 page manual? It took over 2 hours to print, since the printer is in graphics mode, moving slowly for maximum density and clarity. Still, get this program—unless you are using a ProWriter or some other non-Epson standard-ish printer, you will be pleased as punch. Roy, the author, also will send you the program disk plus a complete (pre-printed!) manual for only $10. That almost beats the download charges on the major services, and saves you hours of setup and printing. But order yours soon, since young Mr. Goldman will soon be old enough to drive and may not have as much time to do his remarkable—and very mature—programming. Roy Goldman/ Daisy Dot II, 2440 South Jasmine, Denver, Co 80222.

Another Public Domain Jewel: Magic is a fairly useless but fascinating graphic demo. You can set a slew of different patterns rolling by hypnotically, freeze them, change them, and set colors roaring through them at your whim. I used it to make a background video tape to roll at a party while the dance music played—and was amazed to watch guests sit and watch the thing, mouths agape. OK, I guess it's not useless. Find it and add it to your show-off disk.

Last Item: B.L. Enterprises. Box 7881, Louisville, Kentucky (40207) offers a software package that allows you to use a second Atari 8-bit computer as a 48K RAMDisk. Although this sure sounds like the hard way to avoid an internal upgrade, it may be of interest to some users who have more computers than drives. And as hard to find as 1050s are these days (not to mention the new XF551s). ●



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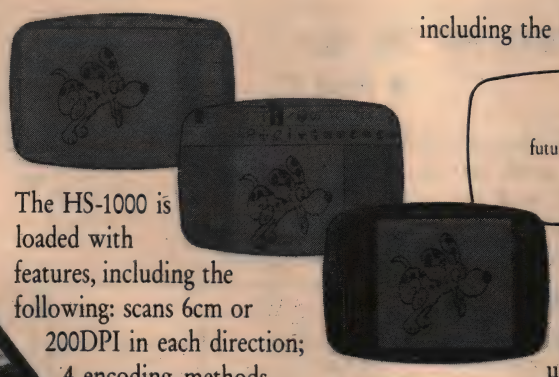

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Daisy-Dot II

Reviewed by Jeff Brenner

Daisy-Dot II is an excellent near-letter quality printer driver for your 8-bit Atari and an Epson, Star Gemini, or graphics compatible printer. This is the newest version of the original Daisy Dot program, written by the original author, Roy Goldman. This is not the same Daisy-Dot II that was described in the January 1988 "Applying The Atari" column. Of the "other" Daisy-Dot II (which was released by The Cryptic Wizard), Roy Goldman writes, "The use of the Daisy-Dot title for this slow and limited program was in no way authorized by myself and was done without my knowledge."

Daisy-Dot II, like the original Daisy-Dot program, has been placed in the public domain by the author. As a public domain program, the program and documentation are remarkably professional as well as useful. The author is relying on contributions from users to reward him for his efforts and to encourage him to continue creating software for the public domain. This shareware concept, as it is termed, may very well be a cure for the shrinking supply of 8-bit software titles, as authors who are having difficulty getting software manufacturers to publish their works decide instead to place their commercial quality creations in the public domain. The only way this system will be successful, however, is if those individuals who use and like the programs take the time to send an appropriate contribution (i.e. money) to the program author. Based on the quality and usefulness of Daisy-Dot II, the author deserves as many contributions as he can get, and I hope any readers who acquire the program and use it will be responsible enough to take the time to send a check to the author. Well, there's my endorsement of the shareware concept. Now let's take a look at what this program can do.

Three Independent Programs

Daisy-Dot II is comprised of three individual sub-programs. The main program is the Print Processor, which handles the actual printing of text. The second program is the Font Editor, which allows you to create and edit Daisy-Dot fonts. The Font Utilities program, the third program, converts standard Atari fonts into the Daisy-Dot format.

The Print Processor

Here is where your text files are printed in near letter quality using any of several proportionally spaced fonts. The text files can be prepared using any word processor that can "print" to disk, including, PaperClip, AtariWriter Plus, and Xlent's First Word Processor. The

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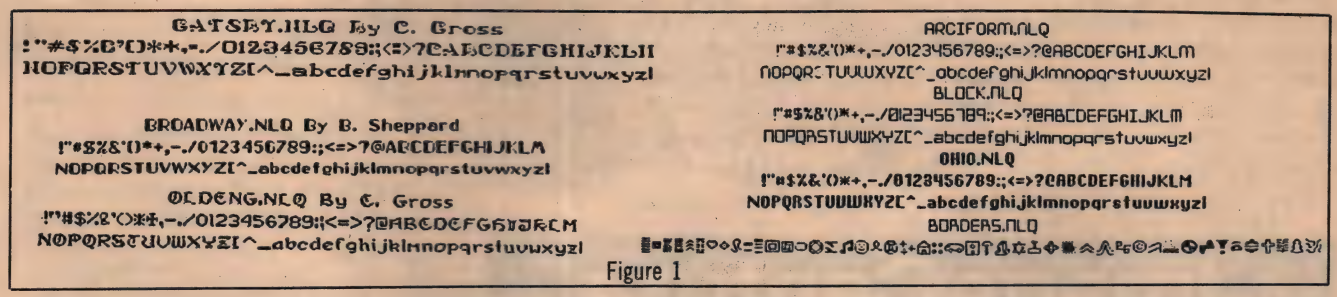

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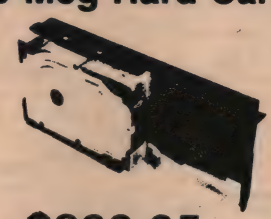

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Unix
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user-friendly shells and utilities, the most famous of which is the Norton group of utilities. Granted that MSDOS was a hurriedly thrown together operating system whose elegance never was there in the first place. It inherited a great deal from CP/M which in turn owed a lot to earlier DEC operating systems.

Unix on the other hand, started from scratch and its authors had paramount in mind the "command interpreter" or shell. To accomplish most jobs, Unix has some 200 utilities built-in to it that do not require third party applications programs to make Unix quite useful. For instance, PageMaker and Ventura cannot hold a candle to the 20 year old Unix TROFF and NROFF, which now are sprouting WYSIWYG screen preview modes to satisfy the current insistence on seeing exactly what your laser output will look like before you fiddle with its results.

Does Unix Need Brute CPU Power?

Well, Unix is a bit slow on an 8088 and not a speed demon on an 8086. But smart systems designers, such as Altos (remember their full-page magazine ads for CP/M and MP/M systems?), always beefed up the system resources by using (almost 10 years ago) Z80 intelligent ports, 8089 intelligent I/O, and on-board RAM to buffer some communication ports so that 9600 bps would not bog down the system. In 1979 I bought an Altos 586, with 5 ports, a 40 MB hard disk, a 720K floppy drive, and the ability to use one of several RS232C networks (slow but quite reliable)—all this 10 years ago! I also used Godbout (CompuPro) S-100 systems with 8 MB of RAM and an IBM-like "channel selector" buffered hard disk I/O that was faster than the many hopped up ESDI or SCSI drives so highly touted these days. CompuPro used static RAM way before Dell Computer or Compaq were even a glint in somebody's eye (both Dell and Compaq are quite proud of their use of variants of static RAM).

No, Unix does not need brute CPU power, but what it does need is sophisticated hardware architecture. The 386 CPU is appropriate for Unix, not because of the 16 or 20MHz power, but because of its ability to deal with protected (paged and segmented) modes and incorporate a Memory Management Unit (MMU) as part of its architecture. The 68020 in the Apple A/UX Mac II needs a separate 68851 MMU to run. The 68030 will have its own MMU and so will be even more appropriate for Unix. The new Sony NWS workstation uses TWIN 68020s

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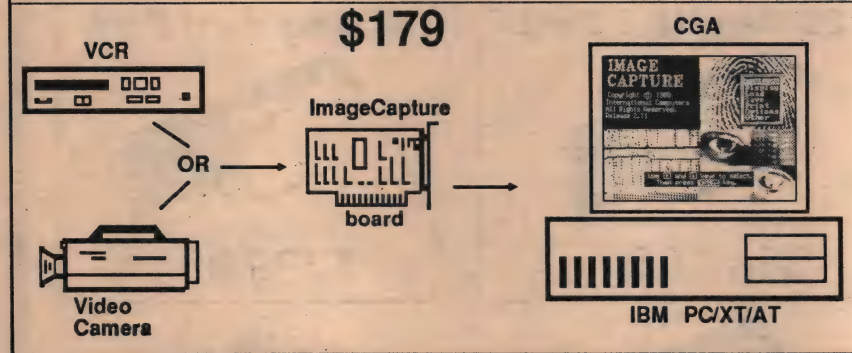

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Daisy-Dot II
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original AtariWriter is not supported since it cannot print to a disk file.

Your text file can be embedded with commands to change the graphic density, change fonts within a line, change horizontal spacing, center lines, fully justify text, block text to the right, print boldface type, underline text, print double-width text, set proportional tabs (for properly aligned tables), and even incorporate picture files within your text. These commands can also be accessed through the Daisy-Dot II menu.

The Fonts

Fourteen fonts are included on the Daisy-Dot II diskette: Arciform, Block, Borders, Broadway, Gatsby, Ohio, Old English, Old West, Roman, Saloon, Sanserif, Script, and subscript and superscript fonts. Figure 1 shows a sample printout of some of these fonts.

The Daisy-Dot II Font Editor is used to create 16x16 fonts for use with Daisy-Dot II, or to modify existing fonts. Although it is included as part of the Daisy-Dot II program, it is actually a full-featured program in itself, offering a fast and easy way to create your own letter quality fonts. Special features include character transcribing (so instead of designing character "F" from scratch, you can copy character "E" and modify it), flipping characters 180 degrees (handy for "p" and "q" design) and character image scrolling to reposition within the 16x16 grid.

Font Utilities

The font utilities program allows you to take a standard Atari 8x8 font, and convert it into the 16x16 format com-

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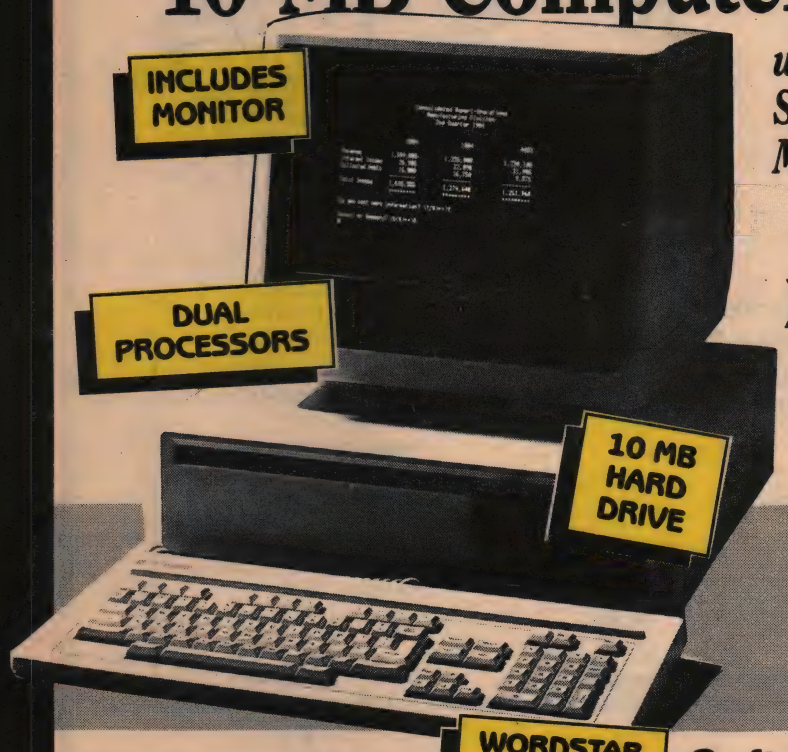

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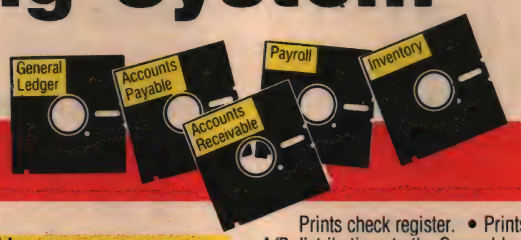

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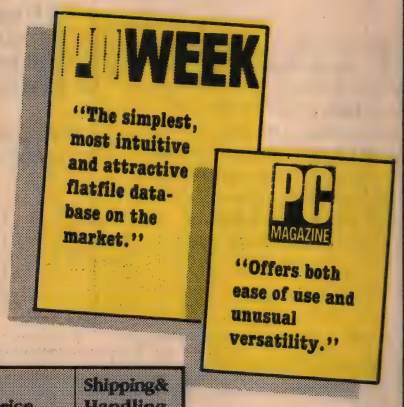
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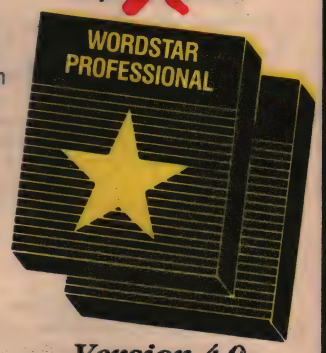

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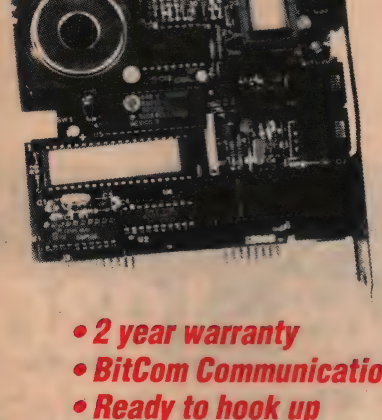

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to help with both processing and I/O. The AT&T 630 1024x1024 graphics terminal uses its own 68000 CPU and 1 MB of 32-bit memory to run programs downloaded from a host 3B2 or the newer 6386 WGS.

Perhaps more than almost any other desktop workstation configuration, Unix can benefit from hard disk cached memory on the disk controller card itself. Distributed Processing Technology sells up to 3 MB of hard disk caching controller that makes a humble ST506 Seagate hard disk really fly under the disk-intensive demands of a busy Unix multi-user system.

Unix started out as a graphics system, based on a PDP-7 graphics workstation, but it soon evolved into less esoteric and more mundane applications. Almost 15 years later, George Lucas used the power of Unix to generate sequences for his "Star Wars" series of hit films and even formed a spin-off company to generate Unix graphics. Of course we are talking about a huge VAX dedicated to producing a single graphics frame. The 3-D logos we have become accustomed to seeing announcing movies of the week on television are designed by dedicated graphics machines which need all the computational (floating point) and memory they can suck up just to generate those scintillating images. However, lower level business graphics are now commonplace with Unix machines. The Computer Graphics Interface (CGI), available as a separate module under Xenix, is taken advantage of by several "all-in-one" office integration products, notably by Innovative Software (now merged with Informix) for their new Xenix 386 SMART package (which generates business graphics in color using the CGI modules).

Give Me Quality Construction Over Brute CPU Power

I am somewhat upset by the current spate of bar charts comparing the IBM PS/2 Model 80 16MHz machine to Johnny-come-latelies that seemingly far outdo the Model 80 in raw CPU power. Well and good. Suppose I buy a 20 MHz CPU with 0 wait state static RAM memory and an Intel caching memory chip, and a 1:1 interleaved 300 MB hard disk. On top of that, I have thrown in a 16-bit (most graphics cards are 8-bit) VGA board that copies its own ROM BIOS over to 32-bit system memory as does the actual motherboard ROM. Now, what do I have? I have a golden sun god of a muscle-bound body builder who will probably lose his swimming trunks with first unruly wave that blasts him off his surf board.

Let's look inside the PS/2 Model 80. What do we see? Room, plenty of room. Almost no cables clutter up the space or impede the air flow. I also see small add-in cards that tell the system what they are without resorting to dip switches. Then I see 2 - 4 MB of motherboard 32-bit RAM snuggled in square little metal-capped nuggets over by the power supply. I also might see 4 - 8 MB of additional RAM on add-in memory cards. So, without much effort, I have before me at least 4 MB of 32-bit RAM and, more likely, 6 to 8 MB just waiting to handle whatever Unix demands.

What else do I see? There under a large IBM blue knob is a 70 MB IBM-made (no third party drives) hard disk that runs off of a small ESDI controller, capable of adding virtually ANY size 2nd hard disk. For instance, right now, I have a 300 MB ESDI drive from Core International in one drive bay and a 330 MB Priam drive in the second, both running off the same small controller (which uses lots of ASICs and surface mount technology, courtesy of Adaptec). Future Domain will soon be shipping a SCSI controller for the Model 80 to use with over 300 MB Micropolis drives.

As for graphics, the motherboard itself has the VGA video controller, which by this time next year will boast 1024x768 resolution and 256 colors—all without resorting to 3rd party add-in boards. At the same time, I will soon see network TCP/IP cards that off-load work so that the CPU does not bog down. As a matter of fact TCP/IP (Ethernet) cards will just be one of a family of high-speed communications coprocessors that will be sprouting all over the PS/2 Model 80 landscape.

In view of all this, who needs the dubious advantage of a simple-minded souped-up CPU (Motorola just announced a 33 MHz processor)?

Multiports And Unix Networks

The name of the game under Unix is how many ports (users) can be supported. An MSDOS machine is a single user box. Add Unix to the same 386 or 68020 machine and you still have a

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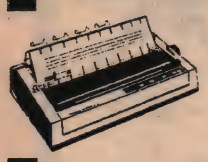
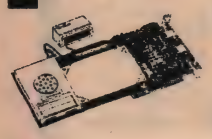
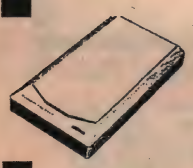

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single-user system, but one, as mentioned earlier, that can carry on multiple sessions at the console. The way sessions are invoked is usually by using the ALT key plus a Function key so that ALT + F2 keeps session one still running and invokes a fresh screen to start a new login and session two. However these multiple sessions from the console, which you might categorize as "virtual" or "logical" ports, only scratch the surface of the potential of Unix. You can buy multiport cards from Arnet, Digiboard, or Computome that give you anywhere from 4 to 8 additional Physical ports per card. This means that you could easily have four multiport cards, giving you a grand total of 32 physical ports. What's more interesting is that most multiport card manufacturers use 80186 on-board slave processors which offload the I/O burden of the main CPU. So that, for instance, I can run four Arnet physical ports at a full 9600 baud, without slowing down overall system performance.

In other words, it is now possible to have a 68020 or 80386 machine that not only has more MIPS than a VAX, but that can also handle as many ports as many of the lower end VAXen (32 ports on a VAX 750 is pushing things a bit).

What is more important than just additional physical ports is the ability to network several systems via a high-speed Ethernet coax cable. Ethernet serves as the physical transport level interface for distributed files systems under Unix, such as NFS (SUN Microsystems and many other 68020 machines) or RFS (the AT&T 6386 Intel and 3B2 platforms). Distributed files systems make for a powerful Local Area Network capability. This means that machine A can access files on machine B as if the remote files were actually part of the local system. Under RFS (Remote File Sharing), each group of networked machines is called a "domain." Domains, in turn can be linked together over the same Ethernet cable. For instance, you could have one domain consisting of 5 AT&T 6386 16MHz desktop machines using a more powerful 6386 20MHz "tower" as a file server, where important system-wide databases are kept, all for under $80,000—which is a far cry from what many minicomputers cost.

Moreover you can have X-Windows running on each domain. X-Windows gives the illusion that you are accessing data on you own machine when, in reality, you have merely opened a window (active login session) on some machine on the network. This is different from file "sharing" in that X-Windows actually logs you into a remote machine but in such a way that you may not even realize that you are not really just starting a session on your own local system. RFS or NFS via the Ethernet protocol called TCP/IP can enable you to log into other machines, but you usually have to know the name of the remote machine and have the equivalent of a user account on that remote machine. X-Windows, in general, is almost totally transparent to the local user (that is, he may not even know on which machine the application he wants to use is located). If all this sounds complicated that is because it requires some network supervisor to initially set up all the links between machines. Information about all the links is kept in a database called a name server or simply the host machine. The peripheral systems are called "client" machines. Under RFS, you can have a backup resource (say a database) on a different domain. This remote domain file server, when set up correctly, is automatically mapped (switched) to in case the local domain file server goes down. This means that a local machine with its 32 users need not ever know just where their shared resources are physical located, hence the broad name of "distributed file systems."

Connecting Apples And Oranges

Now that the Apple Mac II has the A/UX Unix running along with the Mac OS, you can easily plug an Apple "EtherTalk" card into a Mac II and have it participate in an Ethernet network with, say, SUN and AT&T Unix machines. In addition, the Apples could access VAX minicomputers running either the native VAX VMS operating system or DEC's proprietary Ultrix Unix implementation.

One goal of both Apple and of other manufacturers is to have a "heterogenous" network of machines that heretofore could not communicate with each other. Thus you might have microcomputers running Unix accessing DEC

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Splash! The VGA Paint Program

Spinnaker Software Corporation uncovers another masterpiece—Splash!. Unlike any other paint program, Splash! has been designed for the PS/2 and takes full advantage of IBM's new VGA capabilities.

"This is the year that graphics came to the MSDOS world in the form of VGA," said C. David Seuss, Spinnaker president. "We felt that the consumer needed a program that would harness the incredible power of VGA for creative expression."

At $99.95, Splash! turns the mouse into a paint brush, the monitor into a canvas and supplies color and print options that go beyond any imagination. Designed to display 320 by 200 pixel resolutions in 256 simultaneous colors (from a palette of 256,000), each Splash! screen is an electronic drawing board capable of changing hue, saturation and color value with a click of a mouse.

Splash! has 60 different patterns and brush sizes, color fills, stamps, spray cans, and a variety of geometric shapes. Select from pre-defined shades, patterns and stylist tips or create new ones. The fine detailing capabilities of Splash! allows for the marking and magnifying of a minute section of the screen for detailed pixel-by-pixel editing.

And, Splash! is capable of swapping colors, flipping images vertically and/or horizontally, stretching, squeezing, merging, overlaying and underlaying objects, even dragging images to create a 3-D effect. Enter text with up to 13 different fonts or import word processor text and creative possibilities seem endless!

Compatible with Pagemaker, Ventura Publisher and most other desktop publishing programs, Splash! requires a memory of 640K and can produce files that work with TIFF and PC Paintbrush. Like all Spinnaker products, Splash! is designed to be obvious-to-use. There's no need for a degree in art or computer science to use this program.

For more information contact: Spinnaker Software, One Kendall Square, Cambridge, MA 02139; (617)494-1200. ●

Unix

continued from page 485

VAXen and IBM minis or mainframes. IBM has come out strongly supporting their version of Unix, called AIX. AIX now runs on the IBM RT PC, will soon be on the PS/2 Model 80, and on 370-type IBM mainframes. You can imagine the advantages of having such a variety of machines all talking to each other. For instance the PS/2 Model 80 could temporarily download records from a huge database on an IBM mainframe, modify or update those records, and then post the new transactions to the master database on the mainframe. This means that the expensive resources of the mainframe are reserved for number crunching or for sophisticated database manipulation the results of which are made available to the less expensive PC workstations.

As a matter of fact, you can have a "diskless" workstation that has 4 to 16 megabytes of RAM in which data is manipulated, but which always pulls resources off of a huge centrally located file server and stores the updated records back onto the central hard disk. SUN Microsystems has long been known for networking powerful diskless workstations to a file server that has lots of hard disk storage. Under NFS (Network File System), you can even have MSDOS machines talking to Unix machines.

The Bottom Line

The upshot of all these Unix capabilities is that you should not be misled by expensive and highly touted powerful new CPUs, such as the much heralded RISC processor. Plain vanilla 16MHz CPUs are coming down in price, but can be harnessed together to make for a powerful distributed file system that is the equivalent of very expensive time-sharing mainframes. In addition recent versions of Unix run quite well on 68020 or 386 machines, using up to 32 (sometimes more) physical ports, and at least 12 "virtual" ports or login session on the system console itself. RISC machines and 33 MHz 68020s sound esoteric and "sexy," but at least for the time being are probably overkill in many environments. ●

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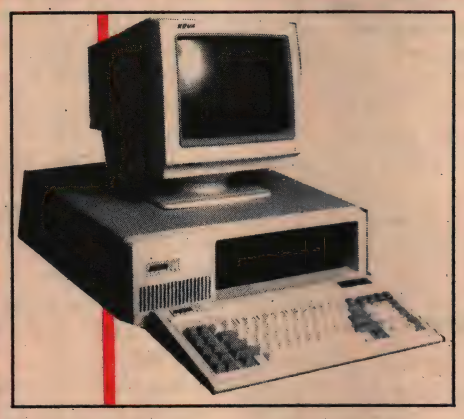

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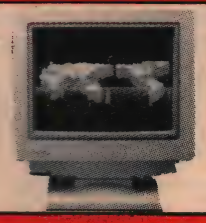

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QMS High-Resolution Color PostScript Printer

QMS, Inc. has become the first company to offer a color PostScript printer with the introduction of their QMS ColorScript 100 printer. With flexible, high performance color PostScript graphics and text capabilities, the QMS ColorScript 100 printer is being targeted toward graphics design and electronic publishing functions in corporate and professional environments.

The QMS ColorScript 100 printer includes an exclusive QMS-designed, external controller with RS-232, Centronics parallel and RS-422/AppleTalk interfacing; a 300x300 dot per inch Mitsubishi G650 color thermal transfer print engine, cabling and manuals.

"QMS has always been an innovator and major player in the PostScript printer marketplace," commented James L. Busby, president and CEO of QMS. "Now, with the introduction of the QMS ColorScript 100 printer, we are the first to offer a color PostScript printing solution. We plan to build on our leadership position in the color output market. The ColorScript 100 is just the next step in our overall color product marketing program which began last fall with the introduction of the Colorgrafix 100 print system," Busby concluded.

At the heart of the QMS ColorScript 100 printer is its exclusive, QMS-designed external controller. Based on a 68020 MPU operating at a 16.67 MHz, the controller comes with 8MB RAM and 1MB ROM; enough to handle a full 11"x17" page of color PostScript text and graphics. The ColorScript 100 incorporates the latest release of PostScript code (Version 49), which includes greatly enhanced color commands and 35 resident typefaces. The controller also has a built-in 20MB hard disk with a SCSI interface that can be used for permanent downloading of non-resident typefaces or extending temporary font cache memory.

The QMS ColorScript 100 controller accepts line voltages from 90—260 VAC. With RS-232, Centronics parallel and RS-422/AppleTalk interfacing, quick and easy connection to most micro, mini and mainframe host environments, including IBM, DEC and Apple, is assured.

Print Engine Features & Functionality

The Mitsubishi G650 print engine uses a sequential color wax-transfer process to lay down square pixels at 300x30 dpi resolution. Color is placed on a page by means of a wax-based ink film. The thermal transfer print head contains thousands of individual heating elements which melt the ink and transfer it onto the paper where it cools to form the required dot pattern. Users have the option to print using either monochrome (black), three color (yellow, cyan and magenta), or four color (black, yellow, cyan and magenta) ink film. When using either a three or four color ink film, the QMS ColorScript 100 printer can produce the seven primary colors (red, green, blue, yellow, cyan, magenta and black) plus white. A virtually unlimited number of secondary colors can be simulated by combining the primary color in dithering or super pixeling routines. The printer is also capable of generating simulated halftones.

The QMS ColorScript 100 printer can output onto thermal transfer paper stock and transparency film in 8.5"x11", 11"x17", A3 or A4 sizes. The engine's print speed will vary depending on the size of page being printed and the type of ink film being used. As a general guideline, the QMS ColorScript 100 printer will output an 8.5"x11" page in slightly less than one minute using a three color ink film. An 11"x17" page will take slightly less than two minutes.

Users can configure the printer for either 90-130 VAC or 180-260 VAC power input by changing a switch setting. The QMS ColorScript 100 printer has a recommended monthly duty cycle of 4000 prints and ships with a 150 sheet 8.5"x11" size paper input tray (A4 size for international units) Optional 11"x17", A3 and A4 size trays are also available.

Primary Application Areas

QMS ColorScript 100 printers will be readily accepted by graphic arts, printing and publishing groups in both professional and corporate settings. In these environments, high-resolution color PostScript printing is needed for the production of final color output and/or intermediate color proofs.

Professional advertising, graphic arts and package design agencies will team the ColorScript 100 with individual and shared color workstations. Using any of a growing number of PostScript design packages, artists and designers will be able to quickly create, update and print high-resolution color renderings and layouts for client review. The printer can output color transparencies for group presentation and serve as a proofing device before files are sent down to more expensive PostScript-based equipment.

In print production environments, the QMS ColorScript 100 printer can produce quick, inexpensive check proofs that closely match the clarity and color balance of a final printed piece. For jobs where 300x300 dpi resolution is sufficient (e.g. newsletters, manuals, operating instructions, internal publications), the ColorScript 100 can even produce final film separations or function as a short run color duplicator.

The QMS ColorScript 100 printer will also prove valuable in "non-artistic" environments where color is needed in hardcopy or transparency format to further define detail and clarify data. Here the printer could be used to output internal or customer presentation graphics and reports, maps, diagnostic reports and engineering graphics.

Software packages are now or will soon be available to support the QMS ColorScript 100 printer in all of its key market and host environments. QMS is working closely with major software vendors, including Adobe Systems, Aldus, ArborText, AutoDesk, Computer Associates, Cricket Software, Lotus, MicroSoft, Precision Visuals, Quark, SAS and Ventura to assist in the development of ColorScript 100 drivers.

Pricing, Availability & Distribution

The QMS ColorScript 100 printer carries a U.S. list price of $24,995 and will be available in production quantities in April. The printer will be sold to OEMs, VARs, major accounts and end users, with initial distribution via QMS and its international network of subsidiaries and authorized distributors. Additional end user distribution in the U.S. and Canada will be available later in the year from specially authorized Laser Connection retail dealers. ●

Micro Design Ships 800 Megabyte WORM Drive

Say hello to the world's most intelligent WORM. With a 65 millisecond access time and a DOS-throughput of over 200 kilobytes per second, the new LaserBank 800 from Micro Design International Inc. (MDI) is believed to be the fastest optical drive on the market. It offers 800 megabytes of Write Once, Read Many (WORM) storage at a speed normally associated only with fixed hard disks. Priced at $9,995, the LaserBank 800 is now available from MDI systems integrators and resellers nationwide.

The LaserBank 800 is easy to install and use; it emulates a removable hard disk with 800 megabytes of storage. Integration into IBM PCs and compatibles is accomplished through the use of MDI's proprietary software and Small Computer System Interface (SCSI) card. Users simply install the SCSI interface into their PC and connect the 50-pin external SCSI cable from the interface to the LaserBank unit. The result is true DOS compatibility: users can execute popular DOS applications, such as WordStar, Lotus 1-2-3, dBase III, and AutoCad, without modification.

"Because it supports standard DOS commands, such as MKDIR, CHDIR, COPY and DEL, users can take immediate advantage of the LaserBank 800's storage capability," said Doug Caldes, Micro Design president. "This unique feature lets users edit files just as they would on a hard drive, yet at the same time, they can address the total memory of the laser disk." This unique feature lets users run all of their PC software as they would on a hard drive, yet at the same time, take advantage of the laser drive's large storage capacity.

Because it functions just like a hard disk, LaserBank 800 is easily integrated into existing microcomputer systems. The system was designed for portability—optical cartridges can be used in any PC system equipped with MDI's LaserBank and software interface. It also supports standard hardware and software-based networks, including the PC Network, PC Token Ring, 3Com, and Ethernet.

The LaserBank 800 was engineered to provide a comprehensive audit trail. The system comes with MDI's FlashBack software, a special program that allows a user to retrieve any version of any file previously written to the LaserBank 800 by the specific date it was stored. According to Caldes, "With FlashBack, we've eliminated the nightmare of back-ups. Since FlashBack is an inherent part of the LaserBank software, there's no need to do a backup—it makes tape backup systems obsolete." And Flashback's menu-driven interface lets users easily manipulate data from last week, last month, or even last year.

The LaserBank 800 lets users access up to seven logical drives with MDI's SCSI adapter. Through a menu-driven interface, users partition each optical disk cartridge into logical volumes which can range from 16 to 400 megabytes. After partitioning the cartridge, users mount the logical disk volumes by assigning them a drive letter (D:, E:, F:, etc.). Once a logical disk volume is mounted, it functions like a standard DOS hard disk drive that can be accessed by any off-the-shelf DOS applications.

The mass storage capabilities of LaserBank 800 make it a perfect choice for a wide variety of industries, including healthcare, insurance, banking, education, manufacturing, utilities, transportation, government, and many others. MDI markets the LaserBank 800 and its entire optical storage product line through direct sales, OEMs and resellers.

For operation, the LaserBank 800 requires an IBM PC, XT, AT, PS/2 machine or compatible; a minimum of 384K of memory; PC/MSDOS 3.0 or greater, one floppy disk drive; and one Winchester hard disk drive (any size).

The suggested resale price for the LaserBank 800 is $9,995; suggested resale for optical cartridges is $150. For more information about the LaserBank 800, contact Micro Design International, 6985 University Boulevard, Winter Park, Florida 32792; (305) 677-8333. ●

Daisy-Dot II
continued from page 478

patible with Daisy-Dot II. The Atari font can be expanded horizontally or vertically (the documentation suggests double height and single width as the most readable combination). The Font Editor can then be used to smooth out the coarseness resulting from the magnification of the lower resolution font.

Another routine in the Font Utilities program will automatically create an italicized version of a Daisy-Dot font, thereby saving you the trouble of having to design one on your own.

Documentation

The 24 page documentation (printed by the program using the Daisy-Dot II near letter quality print) is superb and covers every aspect of the program you need to know. Since the Daisy-Dot process is used to generate the documentation, the examples given to demonstrate the various commands are exactly as they would appear when using the program. For example, the various densities are displayed, the available fonts are printed, the spacing is demonstrated, boldface and double wide print is shown, along with multiple fonts on a line, centering, and justification. The documentation also covers aligning data or numbers for creating charts and tables using the tab commands. A formatting command summary is included at the end of the documentation.

Conclusions

For a shareware program, Daisy-Dot II is an unbeatable deal. The program design, as well as its documentation, is first-class in every way. Let's hope the monetary rewards for the author are enough to motivate him to develop more top-notch applications, and to encourage other authors of high quality 8-bit software to consider the shareware option. ●

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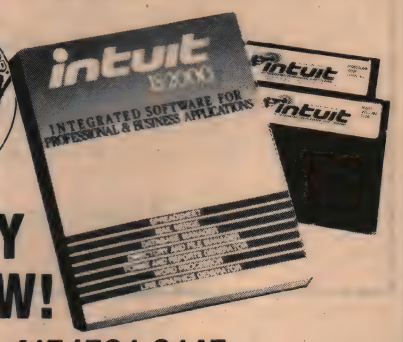

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Comdex/Spring '88—Georgia World Congress Center & Atlanta Apparel Mart, Atlanta Georgia. The Comdex conference is renowned as the world's foremost computer industry marketing forum. More than 700 companies from around the world will be there ready to do business with you. Visit *Computer Shopper* at booth #2060.

May 21, 1988
COMPUTER SWAP MEET, will be held at the Los Angeles County Fairgrounds (Building #5, Sycamore St.) 1101 McKinley Ave., Pomona, CA. Admission is $5. For more information contact RK Productions, Inc. (408) 978-7927, in CA call (800)252-7927.

May 21, 1988
KANSAS CITY COMPUTER SWAP, Park Place Hotel, 1601 N. University Ave. (I-435 at Front St. exit) Kansas City, MS (816)483-9900, call for special rates. 60-8ft tables at $35 each, admission $3. For more information contact Computerama USA, 20219 Mack Ave., Grosse Pointe Woods, MI 48236. (313)884-2243.

May 20-22, 1988
APPLE FEST to be held at Hynes Convention Center in Boston. For more information call 1-800-262-FEST, (in MA 617-860-7100).

May 21—22, 1988
Third Annual Commodore Show will be held at the Nashville Convention Center, 601 Commerce St., Nashville, TN 37201. The Stouffer Nashville Hotel adjoins the Convention Center. For more information contact Commodore Association of the SouthEast, PO Box 2745, Clarksville, TN 37042-2745 or Tom Kujawa, (615)648-1838.

May 22, 1988
Computer Central will be presenting CHICAGOLAND'S OLDEST AND LARGEST MULTI VENDOR PC BARGAIN EXPO at the Woodfield Hilton & Towers, 3400 Euclid Ave., Arlington Ballroom, (one block east of Route #53 on Euclid Ave.) Arlington Heights, IL. Show hours 9:30am to 4:00pm. Admission for adults is $5. For more information call (312) 940-7547.

May 22, 1988
ST. LOUIS COMPUTER SWAP, Holiday Inn-Clayton Plaza, 7730 Bonhomme (btwn I-70 & Hwy. 40) Clayton, MS (314)863-0400. 60-6ft. Tables at $35 each, admission $3. For more information contact Computerama USA, 20219 Mack Ave., Grosse Pointe Woods, MI 48236. (313)884-2243.

May 28, 1988
ELECTROFEST '88. The first annual computer and electronics fair and flea market will be held at Springfield North High School from 9am to 5pm (701 East Home Road, Springfield, OH 45503). Admission is $2 and open to the public. For more information & booth reservation please call Larry Nickels (513) 328-2017.

JUNE

June 4, 1988
The Memphis Area Computer Council (MACC) will be holding our third semi-annual user group fair from 10am to 5pm in the Fulton Building at State Tech located in Northeast Memphis at 5983 Macon Cove just off I-40 at exit 13. Admission is free. For more information write to MACC, P.O. Box 341864, Memphis, TN 38184-1864 or call Gary Cox at (901)358-0667.

June 11, 1988
The Mac Show. To be held at the Vetrans Memorial Building, 4117 Overland Ave., Culver City (SW corner of Overland & Culver Blvd.) General admission $6. For more information, call (213)276-1577.

June 13-17, 1988
THE SEVENTEENTH ANNUAL MEETING OF THE MUMPS USERS' GROUP (MUG) will be held at the New Orleans Marriott, New Orleans, LA. For information contact MUMPS Users' Group, 4321 Hartwick Road, Suite 510, College Park, MD 20740. (301) 779-6555.

June 18, 1988
COMPUTER SWAP MEET will be held at the Los Angeles County Fairgrounds, (Building #5, Sycamore St.) 1101 McKinley Ave., Pomona, CA. Admission is $5. For more information contact RK Productions, Inc. (408) 978-7927, in CA call (800)252-7927.

June 19, 1988
KOMPUFEST (Computer Show & Sale), will be held at the Embassy Suites Hotel, located near I-465 &

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Sat. July 9th **Meadowlands Computer Fair.** Sheraton Hotel, Rt. 3 East, Near Exit 16W N.J. Turnpike, East Rutherford, N.J. 250 Tables. Admission $5.00. Tables $60.00, $50.00.

Sun. July 17th **Pittsburgh Computer Fair.** Holiday Inn, 4859 McKnight Road. 70 Tables. Admission $4.00. Tables $40.00.

Sun. Aug. 7th **Hartford Area Computer Fair.** Ramada Hotel, I-91 & Bridge Street, East Windsor, Ct. 110 Tables. Admission $4.00. Tables $45.00.

Sun. Aug. 14th **Rockland County Computer Fair.** Holiday Inn, Exit 14B, N.Y. Thruway, Suffern, N.Y. 135 Tables. Admission $4.00. Tables $45.00.

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George Washington Willow Grove (Exit 27 off PA TNPK)

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6/19 Boston, MA
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Thoroughbred Releases 8-User PS/2

The Thoroughbred Division of Concept Omega Corporation announced the initial shipment of an eight-user version of its multi-user, multi-tasking operating system, Thoroughbred/OS, running on the IBM Personal System/2 (PS/2) Models 50, 60 and 80, was one month ahead of the company's projected ship date.

The eight-user version, operating with Thoroughbred BASIC (the company's proprietary multi-user business language), is immediately available. Quantity-one list prices for the Thoroughbred offerings on the PS/2 series are: $495 for a single-user version, $895 for a three-user version and $1,695 for the eight-user version.

According to Roger D. Sparks, vice president of marketing for Thoroughbred, "The immediate availability of this eight-user capability on the new IBM machines is a direct result of our accelerated porting efforts. The three-user version of Thoroughbred/OS for the PS/2 has been enthusiastically received by our dealer base—particularly the international base—since its introduction last spring. Therefore, in light of the recent IBM announcement that it has shipped 1,000,000 PS/2 machines already, we felt it was important for all Thoroughbred dealers to be able to upgrade their PS/2 capabilities under Thoroughbred/OS from three users to eight users as quickly as possible."

Sparks noted that the 100-percent compatibility of Thoroughbred BASIC across machine lines enables VARs to move vertical applications that they develop for the PS/2 series to the IBM PC-XT, PC-AT, and compatible machines—or to a variety of machines running UNIX, XENIX and VMS operating systems. He also said that the company plans to offer a version of Thoroughbred BASIC under OS/2 when it is released.

"It makes absolutely no difference where end-user preferences lie after the 'PC standards battle' has been resolved; our VARs will be in a position to answer any and all end-user demands for effective, high-performance multi-user business computing solutions," Sparks said.

According to Sparks, the eight-user PS/2 configuration is obtained by utilizing three IBM dual serial port cards, a serial port on the "motherboard" and the console. "The ability to support as many as eight users in a multi-user, multi-tasking environment on the PS/2 puts Thoroughbred on the cutting edge of technology," he said. "As it now stands, it appears that OS/2 will only be multi-tasking, not multi-user. Therefore, while we intend to extend Thoroughbred BASIC to run under OS/2, with Thoroughbred/OS, our VARs have both multi-tasking and multi-user capabilities—today."

The release of this eight-user version of Thoroughbred/OS in no way signifies completion of the company's development efforts with respect to the PS/2 series, according to Sparks. "Because we continually strive to give our dealers more and better capabilities on the leading multi-user systems, we are already evaluating the 'add-in' hardware necessary to upgrade the number of users on the PS/2. And, contingent upon sufficient dealer demand, we expect to increase the maximum number of users on the PS/2 to at least 16 during 1988," he said. "As end-user computing needs grow and hardware demands change, we want to be absolutely certain that our dealers are in a strong market position."

Concept Omega's corporate headquarters are located at 102 Old Camplain Road, Somerville, NJ 08876. Telephone: (201) 722-9565. ●

Version 3.0 Of Software Bridge Has More Functions

Software Bridge, the popular file conversion program for PC based word processing packages has been enhanced to include support for 5 additional word processing formats and many advanced conversion features.

Systems Compatibility Corporation has added translation capabilities for WordStar 2000, Navy DIF, DCA/FFT, DCA/TXT, and Borland's Sprint.

Files converted with Software Bridge maintain function and format codes (e.g. underlining, centering, bolding, headers, footers, indents, tabs, super and subscripts, etc.) which are contained in the source document. Among the many additional features in Version 3.0 are font support between word processors, side by side and serpentine columns, and footnotes.

Bi-directional conversion capabilities are also provided for the following products up through the current version of each: WordPerfect, Multimate, Microsoft Word, WordStar, DisplayWrite 3 and 4, Samna, Volkswriter 3, Wang PC, DEC WPS Plus (DX), WordMARC, CEOwrite, DCA/RFT.

Software Bridge Version 3.0, $149, is available now on 5¼" or 3½" disks. Registered users of the current version can upgrade for $49.95.

Additional information is available on Software Bridge Version 3.0 and other conversion products from Systems Compatibility Corporation, 401 North Wabash, Suite 600, Chicago, Illinois 60611. 312-329-0700. ●

Coming Events

Michigan Rd., north of Indianapolis from 10am to 5pm. Admission is $3, kids under 3 are admitted free. For more details write to AMERASIA, 5621 W. Liberty Ck. Drive, Indianapolis, IN 46254 or call Ben Yanto at (317)291-1706.

June 20—24, 1988
ACM SIG PLAN, the special interest group dealing with Programming Languages and Programming Language Processors, announces the 1988 conference on Programming Language Design and Implementation to be held at the Colony Square Hotel in Atlanta, GA. For more information contact David Wise, Indiana University, (812)335-9770.

JULY

July 9, 1988
The Meadowlands Computer Fair returns! For this show we will be using the Sheraton Meadowlands Hotel, located at Rt. 3 and exit 16W (just across from Giant Stadium. The show will be open to the public from 10am to 4pm and admission is $5. For more information call Tri-State Fairs at (201)533-1991.

July 9-10, 1988
The Indianapolis Hamfest, state ARRL Convention and Computer Show will be held at the Marion County Fairgrounds on the Southeast side of Indianapolis. Gates open at 6:00am both days, free overnight camper facilities, gate fee $5 per person, children under 12 free. For inside table space call (317)356-4451. For commercial building space call (317)745-6389.

July 10, 1988
The DuPage Amateur Radio Club is sponsoring a Hamfest a Hamfest/Computer show. It will be held at the American Legion Post 80, 4000 Saratoga, Downers Grove, Illinois. Outdoor flea market and swappers row. Admission $3 at the gate, $2 in advance. Gates open at 8:00am. For more information call (312)985-0527.

July 14, 15, 16, 1988
New IBM Workshop: IBM Personal Computer Interfacing for Scientific Instrument Automation will be held in Charlotte, NC. The price is $495 for 3 days. These are hands-on workshops with each participant wiring and testing interfaces on the IBM-PC and other personal computers. For more information, call or write Dr. Linda Leffel, C.E.C., Virginia Tech, Blacksburg, VA 24061, (703)961-4848.

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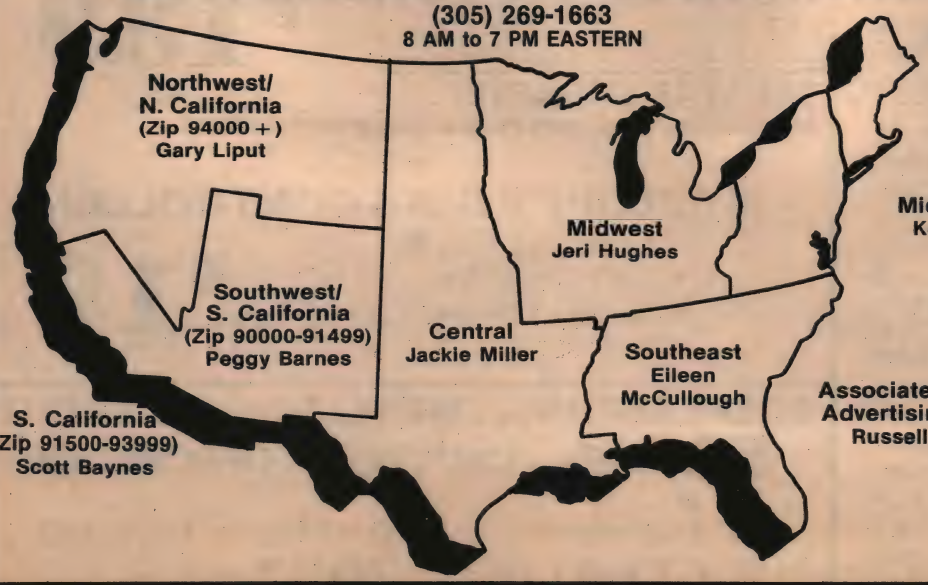

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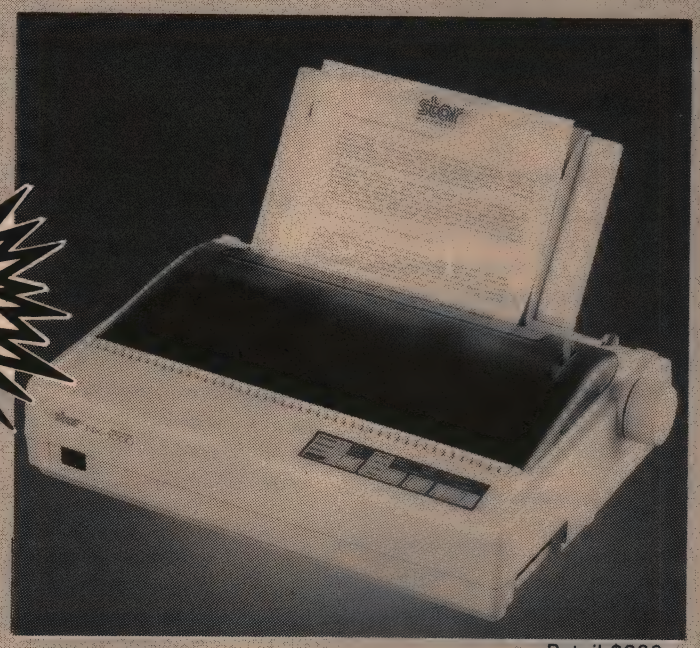

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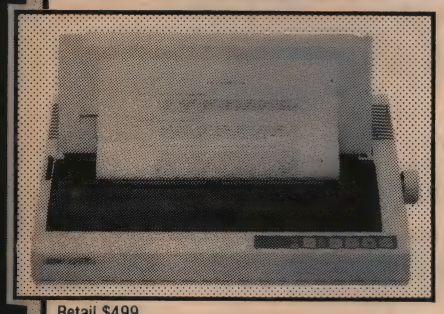

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NB-15	24-Pin, 300 CPS + NLQ, Epson/IBM Comp., 15" Carriage	1399	~~849~~
PowerType	18 CPS Daisywheel, Both Parallel & Serial Interfaces	599	**199**
Star Printer Ribbons		As Low As **99¢** each	

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Fellow Computer User,

To use your computer for business (large or small) you need a full featured, wide carriage business quality printer. It has to have a wide paper carriage so you can read your spreadsheets without a magnifying glass. A business printer also needs the other latest up-to-date features such as a large buffer, exceptional near-letter-quality printing, easy to access type styles, etc.

Unfortunately, a printer with these qualities can cost a lot of money. That's why we have found for you the new Star NX15 printer. It has everything you could want in a business printer and a price that will keep your budget in fine form.

So call one of our friendly sales people today. They will give you further information, send you an NX-15 print sample or take your order. The Star NX-15 could make you a happy businessman with a solid bottom line. Thank you for your generous patronage.

Sincerely,
Mark L Runkle
Mark L. Runkle
President

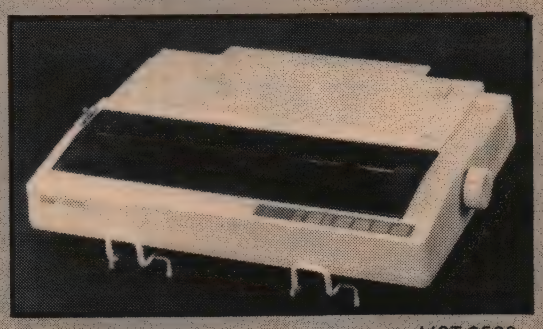
COMPUTER SHOPPER Best Buy OF THE YEAR

MidWest Micro
Winner of Computer Shopper's Best Buy Award for Impact Printer

New easy to use 15" wide carriage business printer. . .

star NX-15

Now Only
~~$319~~
Even Less!



LIST $529

The star NX-15 gives you full front panel control in a 120 cps draft/30 cps near-letter-quality printing. And compatibility with the IBM graphics printer and Epson FX-series printers.

- EASY FRONT PANEL OPERATION
  No more fumbling with dip switches to change modes and functions. With the NX-15, you simply touch a button on the control panel to select the typeface and print pitch, or to print in either draft or near-letter-quality mode. You can even set margins and align forms.
- AUTO PAPER FEED
  It only takes a flip of the paper release lever to automatically feed single sheets into the NX-15. They'll be in position and ready for printing.
- TRACTOR FEED
  Unlike other printers, the Star NX-15 comes with an adjustable tractor as well as friction feed. It provides smooth, reliable use of fanfold paper.
- OUTSTANDING PRINT QUALITY
  Nothing beats the Star NX-15's precise 30 cps near-letter-quality printing or its superb draft quality printing at 120 cps.
- PLUS . . .
  A clean, long-life ribbon cassette, expandable 4 KB print buffer, forward and reverse paper feed and a nationwide service network.
- Full Year Warranty

Complete star Line . . .

		Retail	Sale
NX-10	120 CPS + NLQ, Epson/IBM Compatible	$349	~~$189~~
NX-10C	Commodore Compatible	349	~~179~~
NX-1000	NEW Multi-Font Selection, 144 CPS, 4K, Paper Parking	299	~~179~~
NX-1000C	Commodore Compatible	299	~~179~~
NX-1000CL	Prints 7 Colors	379	~~249~~
LV-1215	120 CPS, IBM Compatible, 136 Column	499	~~199~~
LV-1615	160 CPS, IBM Compatible, 16K, 136 Column	699	~~239~~
LV-2015	200 CPS, IBM Compatible, 16K, 136 Column	799	~~299~~
SD-10	160 CPS, IBM/Apple Comp., Parallel Interface	599	~~219~~
SD-15	160 CPS, IBM/Apple Comp., 15" Carriage	749	~~249~~
SR-10	200 CPS, IBM Compatible, Parallel Interface	679	~~239~~
SR-15	200 CPS, IBM Compatible, 15" Carriage	799	~~299~~
NX-15	120 CPS + NLQ, Epson/IBM Comp., 15" Carriage	529	~~319~~
NR-10	240 CPS, Epson/IBM Comp., 12.6K Print Buffer	579	~~389~~
NR-15	240 CPS, Epson/IBM Comp., 12.6K, 15" Carriage	799	~~439~~
NB24-10	24-Pin, 180 CPS, Epson/IBM Compatible, 8K	749	~~449~~
NB24-15	24-Pin, 180 CPS, Epson/IBM Comp., 15" Carriage	999	~~569~~
NB-15	24-Pin, 300 CPS + NLQ, Epson/IBM Comp., 15" Carriage	1399	~~849~~
PowerType	18 CPS Daisywheel, Both Parallel & Serial Interfaces	599	199
Star Printer Ribbons		As Low As 99¢ each	

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ATD/ZUCKERBOARD
1200 Baud Internal Modem

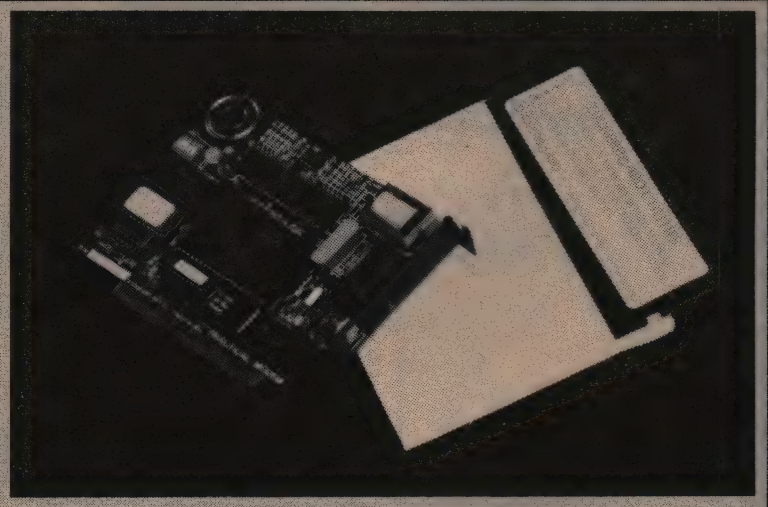
- Fully Hayes Compatible
- Includes PC Talk 3 Software
- 5-Year Warranty

$~~79~~ EVEN LESS

Quantity 3+ $CALL$

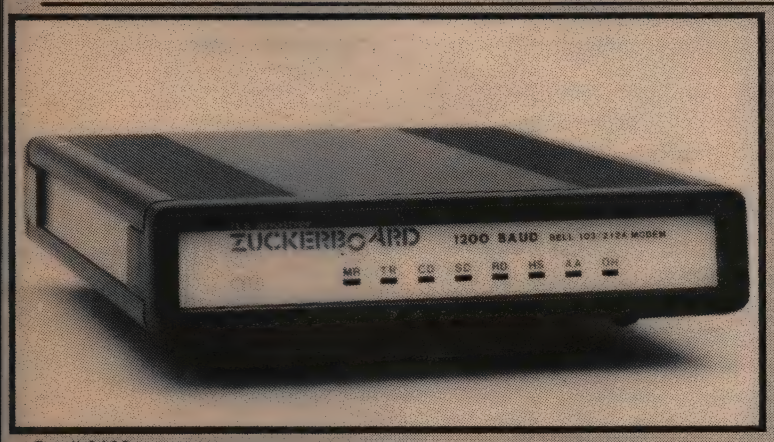
- Fully Hayes Compatible
- Compatible With IBM PC/XT/AT Computers & Compatibles
- Automatic 300-1200 Baud Transmission Speed
- Switch Addressable Com 1-4 for Greater Computer System Flexibility
- Pulse or Tone Dialing
- Auto Dial/Auto Answer
- Speaker With Programmable Volume Adjustment for Line Monitoring
- Dial, Busy & Call Progress Monitoring
- Full/Half Duplex Operation
- Dual Phone Jacks
- Automatic Error Detection
- Comes With PC Talk 3 Software
- 5-Year Warranty

ATD/ZUCKERBOARD
2400 Baud Internal Modem
Retail $199 **$~~139~~** *$CALL$*



#139

You can achieve cost effective, reliable data transmission with the Zuckerboard 1200 baud internal modem. Just plug 'n play and you're in the business of sending information through your phone lines. The 1200 baud internal Zuckerboard modem is industry standard fully Hayes compatible and you can't beat Zuckerboard's 5-year warranty. It's easy to pick a communications winner with the Zuckerboard 1200 baud internal modem.



Retail $169

You can send information quickly and accurately with Zuckerboard's new 1200 baud external modem. The 8 status indicator lights keep you fully informed of transmission progress. Zuckerboard's 1200 baud external modem is compatible with all IBM PC/XT/AT and PS/2 systems and compatibles, as well as many Tandy and Apple computers. The sleek, high tech design of Zuckerboard's 1200 baud external modem will make an attractive addition to your home or office computer system.

ATD/ZUCKERBOARD
1200 Baud External Modem

$~~99~~ EVEN LESS

Quantity 3+ $CALL$

- Fully Hayes Compatible
- Includes PC Talk 3 Software
- 5-Year Warranty

- Fully Hayes Compatible
- Compatible With IBM PC/XT/AT and PS/2 Systems Plus Many Tandy & Apple Computers
- Switch Addressable Com 1-4 for Greater Computer System Flexibility
- Pulse or Tone Dialing
- Speaker With Programmable Volume Adjustment for Line Monitoring
- Dial, Busy & Call Progress Monitoring
- Full/Half Duplex Operation
- Dual Phone Jacks
- Automatic Error Detection
- Comes With PC Talk 3 Software
- 5-Year Warranty

ATD/ZUCKERBOARD
2400 Baud External Modem
Retail $249 **$~~159~~** *$CALL$*

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Quality 24-Pin Printing & Color

ALPS AMERICA ALQ-224 Printer

Your Price
$499
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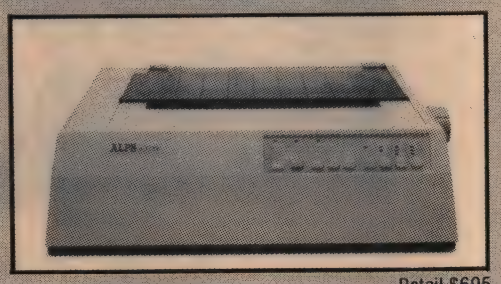
Quantity 3+ *$CALL$*



Retail $695

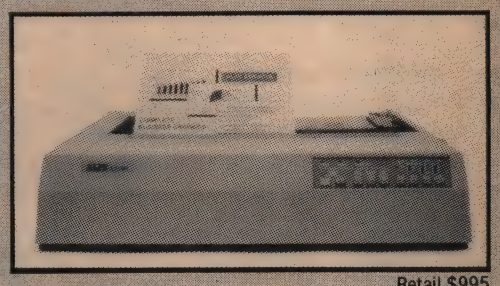
240 CPS • 7 Color Printing • Superb NLQ

The ALQ-224 does everything the ALQ-324 can do, but it does it in less space. Its standard-width carriage is the reason. It will handle all your color and letter quality text printing and it does it better and faster than any other 24-pin, color printer on the market. You can take advantage of the widest possible software selection available for letter quality text or graphics with the ALQ-224 24-pin head configuration. The ALPS ALQ is ruggedly engineered to give you years of dependable quality service.

- 24-Pin Letter Quality Printing
- 240 CPS Draft/120 CPS Correspondence/80 CPS LQ
- Both Epson and IBM Compatible
- High Resolution Graphics
- Prints In 7 Colors, Including Black
- Parallel Interface
- 7K Print Buffer, Upgradable to 71K
- Memory That Remembers Settings After Power Turned Off
- Easy Front Panel Control
- Multiple Font Cartridges Available
- Optional Tractor Feed Available
- One Year Manufacturer's Warranty

ALPS AMERICA ALQ-324 Printer

Your Price
$699
Even Less
Quantity 3+ *$CALL$*



Retail $995

240 CPS • 7 Color Printing • Superb NLQ • 15.5" Carriage

The ALPS America line of printers is based on a simple idea. . . that printers should print. And so they print, with greater speed, reliability and versatility than any other business or home printer in their price range. The ALPS ALQ-324 will give you high resolution graphics in 7 colors, including black and letter quality text so that your every need can be met. The durable, versatile ALQ-324 willl make all your business presentations from color graphics to reports to correspondence look great.

- 24-Pin Letter Quality Printing
- 16", 136 Column Wide Carriage
- 240 CPS Draft/120 CPS Correspondence/80 CPS LQ
- Both Epson and IBM Compatible
- High Resolution Graphics
- Prints In 7 Colors, Including Black
- Parallel Interface
- 7K Print Buffer, Upgradable to 71K
- Memory That Remembers Settings After Power Turned Off
- Easy Front Panel Control
- Multiple Font Cartridges Available
- Optional Tractor Feed Available
- One Year Manufacturer's Warranty

$CALL$ for prices on complete line of ALPS printers:
ALQ 218/318; P2000; P2100;and P2424C.

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Dear Friend,

At MidWest Micro you get the best assistance possible in selecting a computer printer for your home or business needs. You can select from the best models in the industry . . .AND you receive knowledgable assistance from our experienced Sales and Customer Service personnel. Our wide printer selection and personal assistance assure that you get a perfect fit at the best possible savings.

We have teamed up with Panasonic to offer you the high quality and affordable KX-P1080i II and KX-P1091i II printers. Panasonic is a tough competitor in the printer arena and the KX-P1080i II and KX-P1091i II are top contenders for printer performance, price and ease of use.

PC Magazine's review of the KX-P1080i II praised the printer for its "first-class, near-letter-quality mode" and "workmanlike graphics". PC Magazine also commends the KX-P1080i II for enhancing the two fonts, pica and elite, with "excellent versions of bold, underline, italic and proportional typestyles". Panasonic is credited by PC Magazine with offering an excellent User's Manual. "The carefully crafted, 100-plus pages explain step-by-step, in easy to understand terms, how to set-up the printer and use the programming control codes".

You can depend on the Panasonic KX-P1080i II for your home, school or office needs. It will print high-quality reports, correspondence, spreadsheets and graphics . . .quickly and reliably. And its all covered by a two year manufacturer's warranty.

Put speed and flexibility to work for you with a Panasonic KX-P1080i II or KX-P1091i II printer. Call MidWest Micro today and you'll get the assistance you want to select the printer you need.

Sincerely,

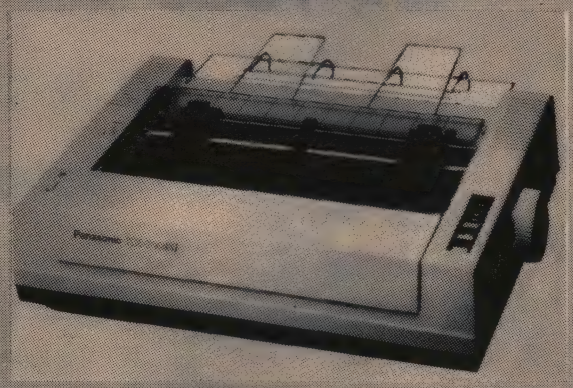
Mark L. Runkle
President

"Competitive performer with an unbeatable price." PC Magazine, 11/10/87

Panasonic KX-P1080*i* II

High Quality NLQ
Built-In Tractor
HiRes Graphics

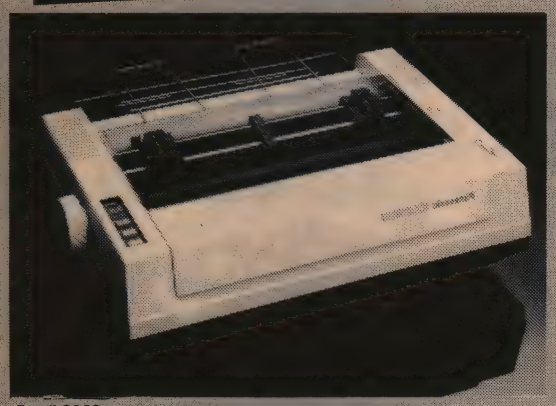
Your Price
$~~179~~
Even Less



Retail $269

- 150 CPS Draft/30 CPS NLQ
- IBM & Epson Compatible
- Standard Parallel Interface
- 1K Print Memory Buffer
- Adjustable Rear Tractor & Friction Feed
- Operator Accessible Print Mode Selector
- Word Processing Functions (Justification, Centering, L & R Alignment)
- Proportional Space Printing
- High Resolution Graphics
- Original +2 Copy Capacity
- 2 Year Manufacturer's Warranty

Panasonic KX-P1091*i* II



Retail $329

You can make the grade with the impressive, high quality printing of the KX-P1091i II. The wide selection of print sizes and styles allows you to print a great looking spreadsheet (in compressed mode) and even headlines in bold proportional mode. It prints at a fast 192 CPS in draft and 38 CPS NLQ. The Panasonic KX-P1091i II has a lot to offer.

$CALL$
For Your Best Price

- Fast 192 CPS Draft/38 CPS NLQ
- IBM & Epson Compatible
- Standard Parallel Interface
- 1K Print Memory Buffer
- Both Rear Tractor & Friction Feed
- High Resolution Graphics
- Wide Variety of Typestyles
- Two Year Manufacturer's Warranty

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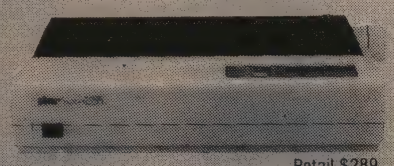
Your Best Printer Value . . .

IBM Compatible NX-1000 Multi-Font

Over 20 Typestyles
With over 20 typestyles at your fingertips, you'll print attractive, exciting documents every time. The NX-1000 also features paper parking so you can feed single sheets without removing fanfold paper.

Your Price
$~~179~~
Even Less

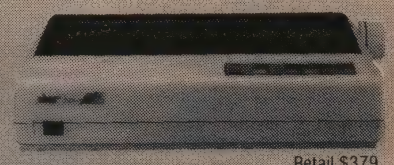

Retail $289

- 144 CPS Draft/36 CPS NLQ
- Over 20 Typestyles
- IBM & Epson Compatible
- 4K Print Buffer Memory
- Parallel Interface
- Paper Parking Feature
- Both Friction & Tractor Feed
- Easy Front Panel Control
- High Resolution Graphics
- One Year Mfg.'s Warranty

IBM Compatible Color Printer NX-1000 Rainbow

Prints In 7 Colors
Color printing adds a whole new dimension to your work. Bring a graph to life or put emphasis in a report. The NX-1000 is your best color printer value.

Your Price
$~~249~~
Even Less


Retail $379

- 144 CPS Draft/36 CPS NLQ
- IBM & Epson Compatible
- 7 Color Printing
- 6.5K Print Buffer Memory
- Parallel Interface
- Paper Parking Feature
- Both Friction & Tractor Feed
- Easy Front Panel Control
- High Resolution Graphics
- One Year Mfg.'s Warranty

Commodore Compatible NX-1000C Multi-Font

Over 20 Type Styles
Now you can really show-off your Commodore computer with the NX-1000C Multi-Font. It has over 20 typestyles to choose from and convenient paper parking.

Your Price
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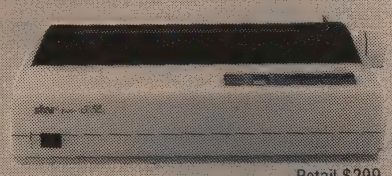
Even Less

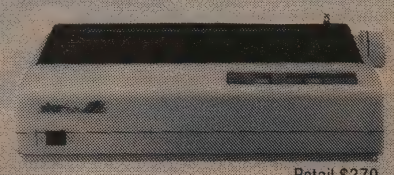

Retail $299

- 144 CPS Draft/36 CPS NLQ
- Over 20 Typestyles
- Commodore Compatible
- Serial Interface
- Paper Parking Feature
- Both Friction & Tractor Feed
- Easy Front Panel Control
- High Resolution Graphics
- Original +2 Copy Capacity
- One Year Manufacturer's Warranty

Commodore Color Printer NX-1000C Rainbow

Prints In 7 Colors
Have all the fun and excitement of color printing with the NX-1000C Rainbow. Emphasize a part in a letter or produce impressive charts and graphics.

Your Price
$~~249~~
Even Less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- 144 CPS Draft/36 CPS NLQ
- Commodore Compatible
- 7 Color Printing
- Serial Interface
- Paper Parking Feature
- Both Friction & Tractor Feed
- Easy Front Panel Control
- High Resolution Graphics
- Over 20 Typestyles
- One Year Mfg.'s Warranty

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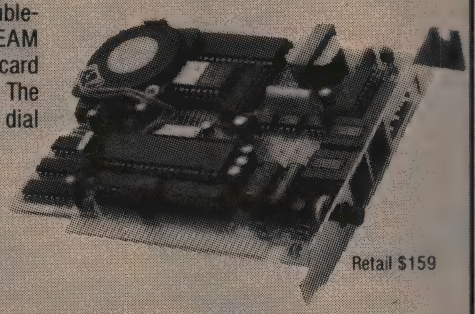
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SmarTEAM's 1200AT external modem has 8 status indicator lights to keep you fully informed of transmission progress. The exciting CompuServe subscription offer gets you on-line fast so you can access nearly 700 information services.

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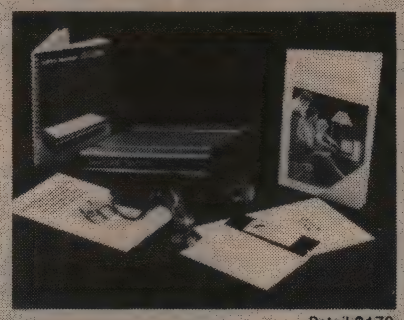
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- Complete With Quick Link Software
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- Speaker With Volume Control
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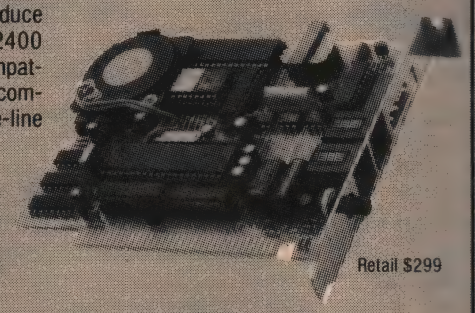
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- Complete With Quick Link Software
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- Auto Dial/Auto Answer
- Extensive Self-Diagnostics
- 40 Character Command Buffer
- Speaker With Volume Control
- 2 Phone Jacks
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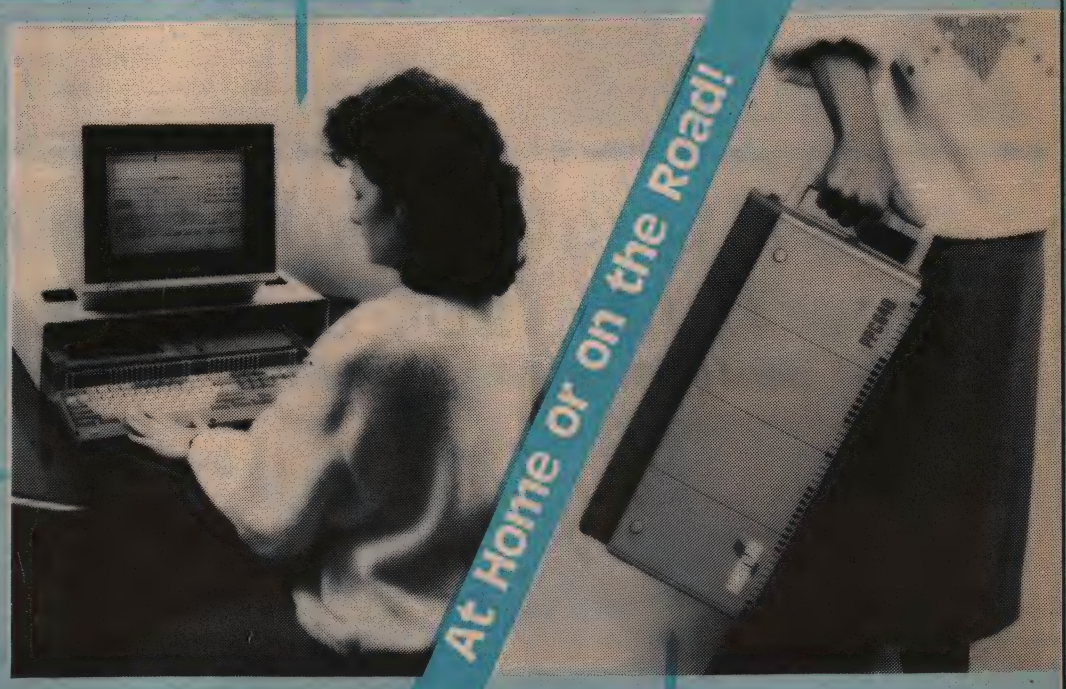

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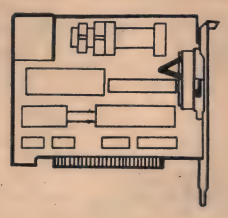

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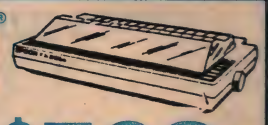

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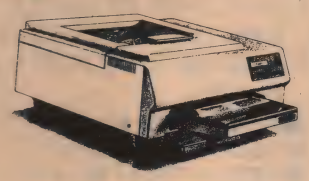

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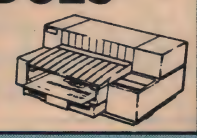

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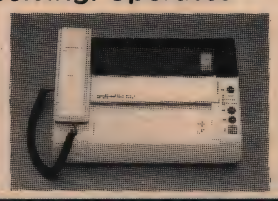

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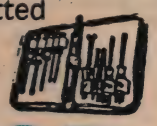
- #1 Phillips & slotted screwdrivers
- Vinyl case

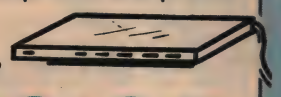


D1-TOOLKIT

$19.95

MINI CENTER POWER SUPPLY

5 control switches: computer, monitor, printer, aux. 1 & 2 plus a master power switch. Overload protection: Resetable 15 amp circuit breaker switch. Modem telephone link protection.



D1-MINICTR

$49.95

6-OUTLET SURGE PROTECTOR

15 amp. fused circuit breaker with reset feature. 3 wire grounded outlets with surge and spike protection. 6 ft. heavy duty line cord

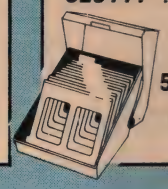
D1-6OUTSP

$8.95

DATA CASES

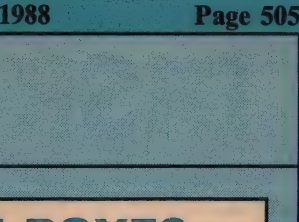
Economy Data Case
Holds 40 3½" diskettes
325010 ... **$6.50** ea.

Economy Data Case
Holds 50 5¼" diskettes
325111 ... **$5.50** ea.



50+ **$3.99** ea.

COMPUTER TAPE



	DESCRIPTION	PART NO.	10-90	100
BASF	ENDURA 2400' with EZ Load II	525JR	12.50	11.95
	ENDURA 2400' with Seals	525JW	11.95	11.50
	QUALIMETRIC GOLD 2400' with Seals	527JW	12.50	11.95
3M	3600' Tape with Seals	700MW	19.25	18.75
	2400' Tape with EZ Load II	700JR	13.50	12.95
	2400' Tape with Seals	700JW	13.95	13.50
MEMOREX Computer Supplies	MRX V 3600' Tape with Seals	638MW	19.25	18.75
	MRX V 2400' Tape with Seals	635JW	12.50	11.95
	MRX V 2400' Tape with EZ Load II	635JR	12.95	12.50
	QUANTUM HD 2400' Tape with Seals	637JW	13.75	13.25
	QUANTUM HD 2400' Tape with EZ Load II	637JR	14.25	13.75
DECADE	2400' Tape with Seals	850JW	10.95	10.50
	2400' Tape with EZ Load II	850JR	11.45	10.95

Shorter length tapes available

USA FLEX

★ *CALL TOLL FREE 7 TO 7 CST MONDAY THRU FRIDAY — 9 TO 2 SATURDAY* ★

No Surcharge for MasterCard or Visa

1-800-872-3539

FAX# 312-351-7204

ORDERING INFORMATION: Minimum order $100. Shipping and handling additional. MasterCard, Visa and Prepaid orders accepted. MasterCard/Visa accounts not billed until product is shipped. Corporations rated 3A2 or better and government accounts are accepted on a net 30 basis. C.O.D. orders under $500, add an additional $5.00 special handling charge. C.O.D. orders over $500, add an additional $10.00 special handling charge. We ship to the 50 states. APO, FPO, AK and HI orders add an additional 5% to the total order to cover PAL and insurance. No sales tax outside of IL. All returns must have a prior authorization from our Customer Service Department (1-312-351-9700). Unauthorized returns and refused shipments are subject to a 20% restocking charge. All prices and specifications are subject to change without notice.

DISKETTES / DATA CARTRIDGES

KAO

100 years of leadership in surface science technology goes into every **KAO** diskette — from raw materials to final packaging.
You can be assured that every **KAO** diskette exceeds all worldwide industry standards.

MAC • PAC

	100+	400+
3½" DS/DD, bulk *1K38A13*	1.14	1.09
Boxed in tens		
3½" High Density, boxed *1K38A11*	3.59	3.49

Nashua DISKETTES

Nashua diskettes are 100% certified

Boxed in tens	100+	500+
5¼" DS/DD, boxed *1L55A11*	.54	.52
5¼" DS/HD, boxed *1L57A11*	1.19	1.09
8' DS/DD, boxed *1L85B31-1*	1.39	1.29

	500+	1000+
5¼" DS/DD, BULK *1M55A14*	.43	.39

Includes: Envelopes, write protect tabs and labels.

VERIFLEX DISKETTES

5¼" Double-Sided, Double Density
Includes: envelopes, labels and write protect tabs.
Veriflex disks are 100% error-free

BULK 26¢ each 10000+ *1V55A19*
27¢ ea., 5000+ 29¢ ea., 1000+ 34¢ ea., 500+ 38¢ ea., 100+

WHITE BOX 32¢ each 10,000+ *1V55A11-W*
34¢ ea., 5,000+ 38¢ ea., 1,000+ 40¢ ea., 500+ 43¢ ea., 100+

WHITE BOX HD 75¢ ea., 1000 *1K57A11*
85¢ ea., 500+ 94¢ ea., 100+

PLASTIC CASE 57¢ ea., 500+ *1X55A11*
59¢ ea., 100+

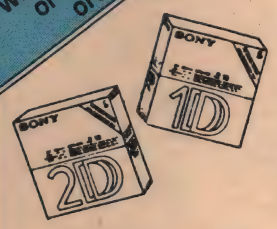
3M 5¼" DS/DD DISKETTES

76¢ ea., 1000 *1Q55A11*
79¢ ea., 100+

5¼" HIGH DENSITY
$1.59 ea., 500 *1Q57A11*

FREE SONY VHS TAPE

With every 100 Sony 3½" boxed or 200 SONY 3½" bulk disks ordered from this ad!!



SONY

Boxed in Tens	100+	500+
3½" SS/DD *1G36A12*	1.14	1.09
3½" DS/DD *1G38A12*	1.64	1.58
5¼" DS/DD *1G55A11*	.89	.79
5¼" DS/HD *1G57A11*	1.69	1.59

SONY. MAC•PAC

	100+	400+
3½" DS/DD *1H38A13*	1.17	1.14

SONY.

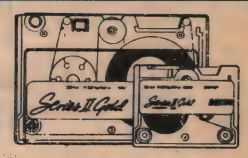
	30+	100+
3½" HIGH DENSITY, BOXED *1G37A11*	4.59	4.39

3M DATA CARTRIDGES

Sold in fives

DC2000	$17.49
DC1000	$13.75
DC600A	$21.95
DC300A	$17.95
DC300XLP	$19.95

DEI



Sold in fives

DEI 300XLP	5-400442	$18.55
DEI 600A	5-400862	$20.15

USA FLEX

★ CALL TOLL FREE 7 TO 7 CST MONDAY THRU FRIDAY — 9 TO 2 SATURDAY ★

MasterCard / Visa not billed until order is shipped!

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FAX# 312-351-7204

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SPRING CLEARANCE SALE!

Some private labels. Limited quantities!!! All sales final.

DISKETTES

3M 5.25" 2 Pack
1Q52A17 ..... **1.39 pack**

Maxell 5.25" 2D96TPI
1S56A31 ..... **1.60 ea.**

Sentinel 8" 2D-Yellow, Bulk
1V81A34YEL ..... **1.00 ea.**

MEDIA ACCESSORIES

5.25" Data Case, Holds 50
325001 ..... **5.18 ea.**

3.5" Amray/Media Mate Cap. 30
325009 ..... **4.78 ea.**

5.25" SRW Library Case holds 10 (Private label)
340042-1 ..... **.58 ea.**

5.25" Library Case — Green
340045 ..... **1.15 ea.**

¼" Cartridge Cleaning Kit - Universal Fit
354002 ..... **13.50 ea.**

RIBBONS

C & Y CITOH F10/D-HITYPE II MS
15-IP473 ..... **1.95 ea.**

C & Y for EPSON LX-80/86
15-IP495 ..... **2.45 ea.**

C & Y for HEWLETT-PACKARD 2608
15-IP520 ..... **4.45 ea.**

IBM PROPRINTER
15-IP562/15-F595 ..... **2.95 ea.**

PANASONIC Series KXP1090
15-IP655 ..... **3.15 ea.**

For RITEMAN 15
15-RITE15 ..... **8.80 ea.**

IBM 5224 Baseball Bat Color
15-F115 ..... **6.00 ea.**

C & Y Apple Imagewriter 4-color on ribbon
15-IP520 ..... **9.50 ea.**

C & Y Toshiba 1350 ½" x 59'
15-IP769 ..... **2.75 ea.**

For Quantel Printers 5100/5122/5130/5131
15-IP770 ..... **2.15 ea.**

Olivetti 111/115 correction ribbon
15-TY160 ..... **3.50 ea.**

C & Y IBM 4245
15-W2017 ..... **12.95 ea.**

C.ITOH Imagewriter 6-pack/color
15-197COLOR ..... **3.45 ea.**

Data Products B300/600 Black
15-198-F ..... **4.95 ea.**

Diablo Black fabric, Matrix printer
15-8R1178 ..... **4.99 ea.**

PRINTERS & ACCESSORIES

Canon A50 - Refurbished
B123-A50 ..... **179.00 ea.**

Star NX15 with tractor feed
B1-STARNX15 ..... **299.00 ea.**

EPSON FX-85
B1-FX85 ..... **249.00 ea.**

Stackable Printer Stand
3-1612-0 ..... **14.99 ea.**

SOUND COVERS

Ring King Sound Cover. Muffles and organizes 80 column space storage for 700 sheets high-density board with smoke acrylic cover. Stock #75000
19-AC0080 ..... **92.00 ea.**

TAPE BACKUP

Mountain AT 40MB-internal
D1-MTN40AT ..... **299.00 ea.**

Mountain XT 40MB
D1-MTN40XT ..... **299.00 ea.**

Sysgen Smart-image-internal
D1-SY60I ..... **429.00 ea.**

Sysgen Smart-image external
D1-SY60E ..... **509.00 ea.**

ADD-ON BOARDS

Genoa Spectrum 132 Column-half-card
D1-SPECTRUM ..... **95.00 ea.**

INTEL 128K Piggyback for above board for AT512
D1-INTEL ..... **164.95 ea.**

INTEL 256K above board for PC/XT
D1-INTEL256K ..... **225.00 ea.**

INTEL 64K PC/XT above board for PC/XT
D1-INTEL64 ..... **225.00 ea.**

Floppy Disk Controller with 2 int./2 ext.
D1-FDC4E ..... **15.00 ea.**

1.2MB External Memory Card
D143-EMX ..... **223.95 ea.**

20MEG Cartridge for Bernoulli Box
5-IOMEGA20 ..... **71.00 ea.**

10MEG Cartridge for Bernoulli Box
5-IOMEGA10 ..... **51.00 ea.**

AT Card with Printer-2 serial-#2 serial option
D1-PSC1 ..... **25.00 ea.**

AT 1 Printer-2 serial-2nd serial installed
D1-PSC2 ..... **45.00 ea.**

4 port serial card
D1-RSC4 ..... **55.00 ea.**

AT Card with parallel 3 serial ports
D1-PSC4 ..... **85.00 ea.**

CABLES

10' Null Cable Male to Female
F1-10NULLMF ..... **12.95 ea.**

Null Modem Cable Male to Male
F1-10NULLMM ..... **12.95 ea.**

12" Serial Female to Femal RS232
F1-12SR25FF ..... **14.95 ea.**

Composite Cable/5-pin to 2 RCA Male
F1-2RCA5DIN ..... **3.95 ea.**

6' Serial, 9-pin to 25-pin, Male to Male
F1-6S9S25M ..... **14.95 ea.**

6' Serial, 25-pin, Female to Female
F1-6SR25FF ..... **9.95 ea.**

8' Serial, 25-pin, Male to Male
F1-8SR25MM ..... **7.95 ea.**

Cable for Sony & Sanyo Monitors
F1-SANYO ..... **4.95 ea.**

Printer Cable, VT220 to Serial, 9-pin Female to 25-pin Male.
F1-VT220 ..... **29.95 ea.**

MISCELLANEOUS

MS-DOS Software Version 2.11
D1-ITT-DOS ..... **9.95 ea.**

Kensington MacModem 300 BPS
C1-MACMODEM ..... **14.95 ea.**

SYSGEN BRIDGE-FILE 5¼" DISK DRIVE

Now owners of PS/2 computers equipped with 3½" disk drives can easily access software and data produced on 5¼" diskettes. **BRIDGE-FILE** breaks down the barrier between incompatible media allowing computer users to create and exchange data through a common medium: 5¼" diskettes!

D1-SYBRIDGE ..... **$249.00 ea.**

Vantage Glare Screen Model F
A249-GL-VF ..... **3.85 ea.**

300 Watt PC Uninterruptable Power Supply
D1-300PCUPS ..... **247.00 ea.**

IBM Monochrome Anti-glare screen
365017 ..... **12.48 ea.**

Memorex Glare Filter Size (MAC)
3-GLAREJ ..... **31.00 ea.**

Memorex Glare Filter Size G
3-GLAREG ..... **31.00 ea.**

Memorex Glare Filter Size A
3-GLAREA ..... **31.00 ea.**

DATA DEVICES Data Cartridge Cleaner for DC 600A/300XLP
7-QICCLEANER ..... **705.00 ea.**

PC STARTER KIT SOFTWARE

Requires PC or compatible; 256K RAM; can be used with color or monochrome monitors; DOS 2.0 or later. Manual incl. **PROGRAMS INCLUDED:** Word Processing, Spreadsheet and Database

STARTER KIT **$9.95**

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Complete customer satisfaction...superior service...friendly, knowledgeable personnel quality merchandise...providing the best values in leading edge technology.

STATIC RAMS

2112	256x4	(450ns)	2.99
2114	1024x4	(450ns)	.99
2114L-2	1024x4	(200ns)(LOW POWER)	1.49
TMM2016-100	2048x8	(100ns)	1.95
HM6116-4	2048x8	(200ns)(CMOS)	1.79
HM6116-3	2048x8	(150ns)(CMOS)	1.85
HM6116LP-4	2048x8	(200ns)(CMOS)(LP)	1.85
HM6116LP-3	2048x8	(150ns)(CMOS)(LP)	1.90
HM6116LP-2	2048x8	(120ns)(CMOS)(LP)	2.45
HM6264LP-15	8192x8	(150ns)(CMOS)(LP)	3.95
HM6264LP-12	8192x8	(120ns)(CMOS)(LP)	4.49
HM43256LP-15	32768x8	(150ns)(CMOS)(LP)	12.95
HM43256LP-12	32768x8	(120ns)(CMOS)(LP)	14.95
HM43256LP-10	32768x8	(100ns)(CMOS)(LP)	19.95

DYNAMIC RAMS

4116-250	16384x1	(250ns)	.49
4116-200	16384x1	(200ns)	.89
4116-150	16384x1	(150ns)	.99
4116-120	16384x1	(120ns)	1.49
MK4332	32768x1	(200ns)	6.95
4164-150	65536x1	(150ns)	1.79
4164-120	65536x1	(120ns)	1.99
MCM6665	65536x1	(200ns)	1.95
TMS4164	65536x1	(150ns)	1.95
4164-REFRESH	65536x1	(150ns)(PIN 1 REFRESH)	2.95
TMS4416	16384x4	(150ns)	3.75
41128-150	131072x1	(150ns)	5.95
TMS4464-15	65536x4	(150ns)	4.95
41256-150	262144x1	(150ns)	3.95
41256-120	262144x1	(120ns)	4.95
41256-100	262144x1	(100ns)	5.49
HM51258-100	262144x1	(100ns)(CMOS)	6.95
1 MB-120	1048576x1	(120ns)	31.95
1 MB-100	1048576x1	(100ns)	34.95

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2708	1024x8	(450ns)(25V)	4.95
2716	2048x8	(450ns)(25V)	3.49
2716-1	2048x8	(350ns)(25V)	3.95
TMS2532	4096x8	(450ns)(25V)	5.95
2732	4096x8	(450ns)(25V)	3.95
2732A	4096x8	(250ns)(21V)	3.95
2732A-2	4096x8	(200ns)(21V)	4.25
27C64	8192x8	(250ns)(12.5V CMOS)	4.95
2764	8192x8	(450ns)(12.5V)	3.49
2764-250	8192x8	(250ns)(12.5V)	3.69
2764-200	8192x8	(200ns)(12.5V)	4.25
MCM68766	8192x8	(350ns)(21V)(24 PIN)	15.95
27128	16384x8	(250ns)(12.5V)	4.25
27C256	32768x8	(250ns)(12.5V CMOS)	7.95
27256	32768x8	(250ns)(12.5V)	5.95
27512	65536x8	(250ns)(12.5V)	11.95
27C512	65536x8	(250ns)(12.5V CMOS)	12.95

xxV=Program Voltage

★★ HIGH-TECH ★★

8052AH WITH BASIC

$34.95

- ★ SINGLE CHIP MICRO-CONTROLLER WITH BASIC IN ROM
- ★ BUILT-IN SERIAL PORT, THREE 16 BIT TIMERS, FIVE INTERRUPTS AND 256 BYTES OF RAM
- ★ REQUIRES VERY FEW PARTS TO BUILD AND EASY-TO-PROGRAM CONTROLLER
- ★ BASIC INTERPRETER IS OPTIMIZED FOR CONTROL APPLICATIONS

★★ SPOTLIGHT ★★

8000

8031	3.95
8035	1.49
8039	1.95
8052AH BASIC	34.95
8080	2.49
8085	1.95
8086	6.49
8088	5.99
8088-2	7.95
8155	2.49
8155-2	3.95
8741	9.95
8748	7.95
8749	9.95
8755	14.95

8200

8203	14.95	8255-5	1.59
8205	3.29	8259	1.95
8212	1.49	8259-5	2.29
8216	1.49	8257	2.25
8224	2.25	8272	4.39
8228	2.25	8274	4.95
8237	3.95	8275	16.95
8237-5	4.75	8279	2.49
8243	1.95	8279-5	2.95
8250	6.95	8282	3.95
8251	1.29	8283	3.95
8251A	1.69	8284	2.25
8253	1.59	8286	3.95
8253-5	1.95	8287	3.95
8255	1.49	8288	4.95

MATH COPROCESSORS

8087	5 MHz	$99.95
8087-2	8 MHz	$159.95
8087-1	10 MHz	$229.95
80287	6 MHz	$179.95
80287-8	8 MHz	$249.95
80287-10	10 MHz	$309.95
80387-16	16 MHz	$499.95
80387-20	20 MHz	$799.95

intel®

74LS00

74LS00	.16	74LS112	.29	74LS241	.69
74LS01	.18	74LS122	.45	74LS242	.69
74LS02	.17	74LS123	.49	74LS243	.69
74LS03	.18	74LS124	2.75	74LS244	.69
74LS04	.16	74LS125	.39	74LS245	.79
74LS05	.18	74LS126	.39	74LS251	.49
74LS08	.18	74LS132	.39	74LS253	.49
74LS09	.18	74LS133	49	74LS257	.39
74LS10	.16	74LS136	.39	74LS258	.49
74LS11	.22	74LS138	.39	74LS259	1.29
74LS12	.22	74LS139	.39	74LS260	.49
74LS13	.26	74LS145	.99	74LS266	.39
74LS14	.39	74LS147	.99	74LS273	.79
74LS15	.26	74LS148	.99	74LS279	.39
74LS20	.17	74LS151	.39	74LS280	1.98
74LS21	.22	74LS153	.39	74LS283	.59
74LS22	.22	74LS154	1.49	74LS290	.89
74LS27	.23	74LS155	.59	74LS293	.89
74LS28	.26	74LS156	.49	74LS299	1.49
74LS30	.17	74LS157	.35	74LS322	3.95
74LS32	.18	74LS158	.29	74LS323	2.49
74LS33	.28	74LS160	.29	74LS365	.39
74LS37	.26	74LS161	.39	74LS367	.39
74LS38	.26	74LS162	.49	74LS368	.39
74LS42	.39	74LS163	.39	74LS373	.79
74LS47	.75	74LS164	.49	74LS374	.79
74LS48	.85	74LS165	.65	74LS375	.95
74LS51	.17	74LS166	.95	74LS377	.79
74LS73	.29	74LS169	.95	74LS390	1.19
74LS74	.24	74LS173	.49	74LS393	.79
74LS75	.29	74LS174	.39	74LS541	1.49
74LS76	.29	74LS175	.39	74LS624	1.95
74LS83	.49	74LS191	.49	74LS640	.99
74LS85	.49	74LS192	.69	74LS645	.99
74LS86	.22	74LS193	.69	74LS670	.89
74LS90	.39	74LS194	.69	74LS682	3.20
74LS92	.49	74LS195	.69	74LS688	2.40
74LS93	.39	74LS196	.59	74LS783	22.95
74LS95	.49	74LS197	.59	25LS2521	2.80
74LS107	.34	74LS221	.59	26LS31	1.95
74LS109	.36	74LS240	.69	26LS32	1.95

7400

7400	.19
7402	.19
7404	.19
7406	.29
7407	.29
7408	.24
7410	.19
7411	.25
7414	.49
7416	.25
7417	.25
7420	.19
7430	.19
7432	.29
7438	.29
7442	.49
7445	.69
7447	.89
7473	.34
7474	.33
7475	.45
7476	.35
7483	.50
7485	.59
7486	.35
7489	2.15
7490	.39
7493	.35
74121	.29
74123	.49
74125	.45
74150	1.35
74151	.55
74153	.55
74154	1.49
74157	.55
74159	1.65
74161	.69
74164	.85
74166	1.00
74175	.89
74367	.65

LINEAR

TL071	.69	LM567	.79
TL072	1.09	NE570	2.95
TL074	1.95	NE592	.98
TL082	.99	LM723	.49
TL084	1.49	LM733	.98
LM301	.34	LM741	.29
LM309K	1.25	LM747	.69
LM311	.59	MC1330	1.69
LM311H	.89	MC1350	1.19
LM317K	3.49	LM1458	.35
LM317T	.69	LM1488	.49
LM318	1.49	LM1489	.49
LM319	1.25	LM1496	.85
LM320	see7900	ULN2003	.79
LM323K	3.49	XR2206	3.95
LM324	.34	XR2211	2.95
LM331	3.95	LM2917	1.95
LM334	1.19	CA3046	.89
LM335	1.79	CA3146	1.29
LM336	1.75	MC3373	1.29
LM338K	4.49	MC3470	1.95
LM339	.59	MC3480	8.95
LM340	see7800	MC3487	2.95
LF353	.59	LM3900	.49
LF356	.99	LM3911	2.25
LF357	.99	LM3909	.98
LM358	.59	LM3914	1.89
LM380	.89	MC4024	3.49
LM383	1.95	MC4044	3.99
LM386	.89	RC4136	1.25
LM393	.45	RC4558	.69
LM394H	5.95	LM13600	1.49
TL494	4.20	75107	1.49
TL497	3.25	75110	1.95
NE555	.29	75150	1.95
NE556	.49	75154	1.95
NE558	.79	75188	1.25
NE564	1.95	75189	1.25
LM565	.95	75451	.39
LM566	1.49	75452	.39
NE590	2.50	75477	1.29

H=TO-5 CAN, K=TO-3, T=TO-220

6500

1.0 MHz

6502	2.25
65C02 (CMOS)	7.95
6520	1.65
6522	2.95
6526	13.95
6532	5.95
6545	2.95
6551	2.95

2.0 MHz

6502A	2.69
6520A	2.95
6522A	5.95
6532A	11.95
6545A	3.95
6551A	6.95

3.0 MHz

6502B	4.25

Z-80

2.5 MHz

Z80-CPU	1.25

4.0 MHz

Z80A-CPU	1.29
Z80A-CTC	1.69
Z80A-DART	5.95
Z80A-DMA	5.95
Z80A-PIO	1.89
Z80A-SIO/0	5.95
Z80A-SIO/1	5.95
Z80A-SIO/2	5.95

6.0 MHz

Z80B-CPU	2.75
Z80B-CTC	4.25
Z80B-PIO	4.25
Z80B-DART	6.95
Z80B-SIO/0	12.95
Z80B-SIO/2	12.95
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1771	4.95
1791	9.95
1793	9.95
1795	12.95
1797	12.95
2791	19.95
2793	19.95
2797	29.95
8272	4.39
UPD765	4.39
MB8876	12.95
MB8877	12.95
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2143	6.95
9216	6.29

V 20 SERIES

V20*	5 MHz	8.95
V20*	8 MHz	10.95
V20*	10 MHz	12.95
V30	8 MHz	13.95

*Replaces 8088 to speed up PC 10-40%

PALS

16L8	$2.95
16R8	$2.95
16R6	$2.95
16R4	$2.95

6800

1.0 MHz

6800	1.95
6802	2.95
6803	3.95
6809	2.95
6809E	2.95
6810	1.95
6820	2.95
6821	1.25
6840	3.95
6843	4.95
6844	6.95
6845	2.75
6847	4.75
6850	1.95
6883	22.95

2.0 MHz

68B00	2.95
68B02	3.95
68B09E	5.49
68B09	5.99
68B21	1.85
68B45	4.95
68B50	1.75
68000	9.95

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MM58174	9.95
MSM5832	2.95

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BR1941	4.95
4702	9.95
COM8116	8.95

INTERSIL

ICL7106	9.95
ICL7107	10.95
ICL7660	1.99
ICL8038	3.85
ICM7207A	5.95
ICM7208	15.95

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AY3-1015	4.95
TR1602	3.95
2651	4.95
IM6402	3.95
IM6403	9.95
INS8250	6.95
NS16450	10.95

MISC.

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ADC0809	3.85
DAC0800	3.29
DAC0808	1.95
DAC1022	5.95
MC1408L8	1.95
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8T97	.59
DP8304	2.29
9334	1.75
9368	2.85
9602	.69
ULN2003	.79
MAX232	7.95
MC3470	1.95
MC3487	2.95
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32.768 KHz	.95
1.0 MHz	2.95
1.8432	2.95
2.0	1.95
2.4576	1.95
3.579545	1.95
4.0	1.95
5.0	1.95
5.0688	1.95
6.0	1.95
6.144	1.95
8.0	1.95
10.0	1.95
10.738635	1.95
12.0	1.95
14.31818	1.95
16.0	1.95
18.0	1.95
18.432	1.95
20.0	1.95
22.1184	1.95
24.0	1.95
32.0	1.95

OSCILLATORS

1.0MHz	5.95
1.8432	5.95
2.0	5.95
2.4576	5.95
2.5	5.95
4.0	4.95
5.0688	4.95
6.0	4.95
6.144	4.95
8.0	4.95
10.0	4.95
12.0	4.95
16.0	4.95
18.432	4.95
20.0	4.95
24.0	4.95

74F/74S

74F00	.35
74F02	.35
74F04	.35
74F08	.35
74F10	.35
74F32	.35
74F64	.55
74F74	.39
74F86	.55
74F138	.79
74F139	.79
74F253	.89
74F157	.89
74F240	1.29
74S00	.29
74S02	.29
74S04	.29
74S08	.35
74S10	.29
74S32	.35
74S74	.49
74S86	.35
74S112	.50
74S124	2.75
74S138	.79
74S153	.79
74S157	.79
74S158	.95
74S163	1.29
74S175	.79
74S195	1.49
74S240	1.49
74S241	1.49
74S244	1.49
74S280	1.95
74S287	1.69
74S288	1.69
74S299	2.95
74S373	1.69
74S374	1.69
74S471	4.95
74S571	2.95

CMOS/HIGH SPEED CMOS

4001	.19	4066	.29	74HC154	1.09
4011	.19	4069	.19	74HC157	.55
4012	.25	4070	.29	74HC244	.85
4013	.35	4081	.22	74HC245	.85
4015	.29	4093	.49	74HC273	.69
4016	.29	14411	9.95	74HC373	.69
4017	.49	14433	14.95	74HC374	.69
4018	.69	14497	6.95	74HCT00	.25
4020	.59	4503	.49	74HCT02	.25
4021	.69	4511	.69	74HCT04	.27
4023	.25	4518	.85	74HCT08	.25
4024	.49	4528	.79	74HCT32	.27
4025	.25	4538	.95	74HCT74	.45
4027	.39	4702	9.95	74HCT138	.55
4028	.65	74HC00	.21	74HCT139	.55
4040	.69	74HC02	.21	74HCT161	.79
4042	.59	74HC04	.25	74HCT240	.89
4044	.69	74HC08	.25	74HCT244	.89
4046	.69	74HC10	.25	74HCT245	.99
4047	.69	74HC14	.35	74HCT273	.99
4049	.29	74HC32	.35	74HCT373	.99
4050	.29	74HC74	.35	74HCT374	.99
4051	.69	74HC86	.45	74HCT393	.99
4052	.69	74HC138	.45	74HCT4017	1.19
4053	.69	74HC139	.45	74HCT4040	.99
4060	.69	74HC151	.59	74HCT4060	1.49

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CAPACITORS

TANTALUM

1.0µf	15V	.12	1.0µf	35V	.45
6.8	15V	.42	2.2	35V	.19
10	15V	.45	4.7	35V	.39
22	15V	.99	10	35V	.69

DISC

10pf	50V	.05	.001µf	50V	.05
22	50V	.05	.005	50V	.05
33	50V	.05	.01	50V	.07
47	50V	.05	.05	50V	.07
100	50V	.05	.1	12V	.10
220	50V	.05	.1	50V	.12

MONOLITHIC

.01µf	50V	.14	.1µf	50V	.18
.047µf	50V	.15	.47µf	50V	.25

ELECTROLYTIC

RADIAL			AXIAL		
1µf	25V	.14	1µf	50V	.14
4.7	50V	.11	10	50V	.16
10	50V	.11	22	16V	.14
47	35V	.13	47	50V	.19
100	16V	.15	100	35V	.19
220	35V	.20	470	50V	.29
470	25V	.30	1000	16V	.29
2200	16V	.70	2200	16V	.70
4700	25V	1.45	4700	16V	1.25

RESISTOR NETWORKS

SIP	10 PIN	9 RESISTOR	.69
SIP	8 PIN	7 RESISTOR	.59
DIP	16 PIN	8 RESISTOR	1.09
DIP	16 PIN	15 RESISTOR	1.09
DIP	14 PIN	7 RESISTOR	.99
DIP	14 PIN	13 RESISTOR	.99

38 PIN CENTRONICS

IDCEN36	RIBBON CABLE	3.95
CEN36	SOLDER CUP	1.85
IDCEN36/F	RIBBON CABLE	4.95
CEN36PC Rt Angle PC Mount		1.85

EDGECARD CONNECTORS

100 Pin	ST	S-100	.125	3.95
100 Pin	WW	S-100	.125	4.95
62 Pin	ST	IBM PC	.100	1.95
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44 Pin	ST	STD	.156	1.95
44 Pin	WW	STD	.156	4.95

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.01 µf CERAMIC DISC	100/$5.00
.01 µf MONOLITHIC	100/$10.00
.1 µf CERAMIC DISC	100/$6.50
.1 µf MONOLITHIC	100/$12.50

25 PIN D-SUB GENDER CHANGERS $7.95

EMI FILTER $4.95

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2 conductor 39¢
3 conductor 99¢
3 conductor w/female socket
$1.49

VOLTAGE REGULATORS

7805T	.49	7812K	1.39
7808T	.49	7905K	1.69
7812T	.49	7912K	1.49
7815T	.49	78L05	.49
7905T	.59	78L12	.49
7908T	.59	79L05	.69
7912T	.59	79L12	1.49
7915T	.59	LM323K	4.79
7805K	1.59	LM338K	6.95

DISCRETE

1N751	.15	4N28	.69
1N4148	25 $1.00	4N33	.89
1N4004	10 $1.00	4N37	1.19
1N5402	.25	MCT-2	.59
KBP02	.55	MCT-6	1.29
2N2222	.25	TIL-111	.99
PN2222	.10	2N3906	.10
2N2907	.25	2N4401	.25
2N3055	.79	2N4402	.25
2N3904	.10	2N4403	.25
4N26	.69	2N6045	1.75
4N27	.69	TIP31	.49

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UL APPROVED

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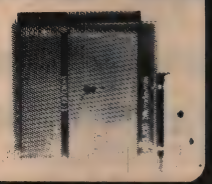
EXT-80286 $39.95



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GOLD-PLATED EDGE-CARD FINGERS
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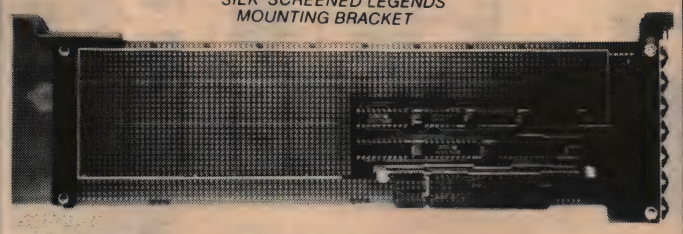

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JDR-PR32 $69.95
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16 BIT WITH I/O DECODING CIRCUITRY
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PARTS KIT FOR ABOVE
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WBU-204	1660	TIE POINTS	24.95
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IN ASSORTED COLORS $27.50
100ea: 5.5", 6.0", 6.5", 7.0"
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500 feet $13.25 1000 feet $21.95

Please specify color:
Blue, Black, Yellow or Red

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DESCRIPTION	ORDER BY	CONTACTS 10	20	26	34	40	50
SOLDER HEADER	IDHxxS	.82	1.29	1.68	2.20	2.58	3.24
RIGHT ANGLE SOLDER HEADER	IDHxxSR	.85	1.35	1.76	2.31	2.72	3.39
WIREWRAP HEADER	IDHxxW	1.86	2.98	3.84	4.50	5.28	6.63
RIGHT ANGLE WIREWRAP HEADER	IDHxxWR	2.05	3.28	4.22	4.45	4.80	7.30
RIBBON HEADER SOCKET	IDSxx	.63	.89	.95	1.29	1.49	1.69
RIBBON HEADER	IDMxx	---	5.50	6.25	7.00	7.50	8.50
RIBBON EDGE CARD	IDExx	.85	1.25	1.35	1.75	2.05	2.45
10' GREY RIBBON CABLE	RCxx	1.60	3.20	4.10	5.40	6.40	7.50

FOR ORDERING INSTRUCTIONS, SEE D-SUBMINIATURE CONNECTORS, BELOW

D-SUBMINIATURE CONNECTORS

DESCRIPTION		ORDER BY	CONTACTS 9	15	19	25	37	50
SOLDER CUP	MALE	DBxxP	.45	.59	.69	.69	1.35	1.85
	FEMALE	DBxxS	.49	.69	.75	.75	1.39	2.29
RIGHT ANGLE PC SOLDER	MALE	DBxxPR	.49	.69	---	.79	2.27	---
	FEMALE	DBxxSR	.55	.75	---	.85	2.49	---
WIREWRAP	MALE	DBxxPWW	1.69	2.56	---	3.89	5.60	---
	FEMALE	DBxxSWW	2.76	4.27	---	6.84	9.95	---
IDC RIBBON CABLE	MALE	IDBxxP	1.39	1.99	---	2.25	4.25	---
	FEMALE	IDBxxS	1.45	2.05	---	2.35	4.49	---
HOODS	METAL	MHOODxx	1.05	1.15	1.25	1.25	---	---
	GREY	HOODxx	.39	.39	---	.39	.69	.75

ORDERING INSTRUCTIONS:
INSERT THE NUMBER OF CONTACTS IN THE POSITION MARKED "xx" OF THE "ORDER BY" PART NUMBER LISTED. EXAMPLE: A 15 PIN RIGHT ANGLE MALE PC SOLDER WOULD BE DB15PR.

MOUNTING HARDWARE 59¢

IC SOCKETS/DIP CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS 8	14	16	18	20	22	24	28	40
SOLDERTAIL SOCKETS	xxST	.11	.11	.12	.15	.18	.15	.20	.22	.30
WIREWRAP SOCKETS	xxWW	.59	.69	.69	.99	1.09	1.39	1.49	1.69	1.99
ZIF SOCKETS	ZIFxx	---	4.95	4.95	---	5.95	---	5.95	6.95	9.95
TOOLED SOCKETS	AUGATxxST	.62	.79	.89	1.09	1.29	1.39	1.49	1.69	2.49
TOOLED WW SOCKETS	AUGATxxWW	1.30	1.80	2.10	2.40	2.50	2.90	3.15	3.70	5.40
COMPONENT CARRIERS	ICCxx	.49	.59	.69	.99	.99	.99	.99	1.09	1.49
DIP PLUGS (IDC)	IDPxx	.95	.49	.59	1.29	1.49	---	.85	1.49	1.59

FOR ORDERING INSTRUCTIONS, SEE D-SUBMINIATURE CONNECTORS, ABOVE

SPECTRONICS CORPORATION EPROM ERASERS

Model	Timer	Chip Capacity	Intensity (uW/Cm²)	Unit Cost
PE-140	NO	9	8,000	$89
PE-140T	YES	9	8,000	$139
PE-240T	YES	12	9,600	$189

DATARASE

- ERASES 2 EPROMS IN 10 MINUTES
- VERY COMPACT, NO DRAWER
- THIN METAL SHUTTER PREVENTS UV LIGHT FROM ESCAPING

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FND-500(503)	COM CATHODE	.5"	1.49
FND-507(510)	COM ANODE	.5"	1.49
MAN-72	COM ANODE	.3"	.99
MAN-74	COM CATHODE	.3"	.99
TIL-313	COM CATHODE	.3"	.45
TIL-311	4x7 HEX W/LOGIC	.270"	10.95

DIFFUSED LEDs

		1-99	100-UP
JUMBO RED	T1¾	.10	.09
JUMBO GREEN	T1¾	.14	.12
JUMBO YELLOW	T1¾	.14	.12
MOUNTING HDW	T1¾	.10	.09
MINI RED	T1	.10	.09

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HOLDER $1.49

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- SLIPS OVER WIRE WRAP PINS
- IDENTIFIES PIN NUMBERS ON WRAP SIDE OF BOARD
- CAN WRITE ON THE PLASTIC; SUCH AS AN IC #

PINS	PART #	PCK. OF	PRICE
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16	IDWRAP 16	10	1.95
18	IDWRAP 18	5	1.95
20	IDWRAP 20	5	1.95
22	IDWRAP 22	5	1.95
24	IDWRAP 24	5	1.95
28	IDWRAP 28	5	1.95
40	IDWRAP 40	5	1.95

PLEASE ORDER BY NUMBER OF PACKAGES (PCK. OF)

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SPDT	MINI-TOGGLE ON-ON	1.25
DPDT	MINI-TOGGLE ON-ON	1.50
DPDT	MINI-TOGGLE ON-OFF-ON	1.75
SPST	MINI-PUSHBUTTON N.O.	.39

DIP SWITCHES

4 position	.85	7 position	.95
5 position	.90	8 position	.95
6 position	.90	10 position	1.29

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CAN BE SNAPPED APART TO MAKE ANY SIZE HEADER, ALL WITH .1" CENTERS

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2x40	2 STRAIGHT LEADS	2.49
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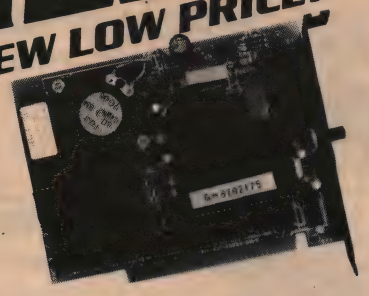

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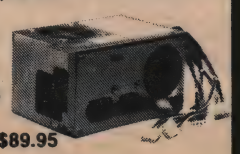

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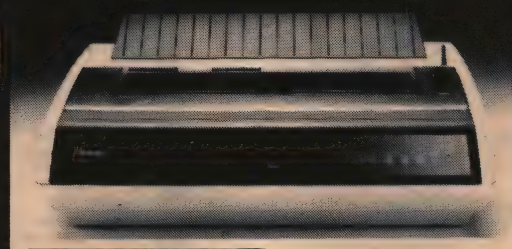

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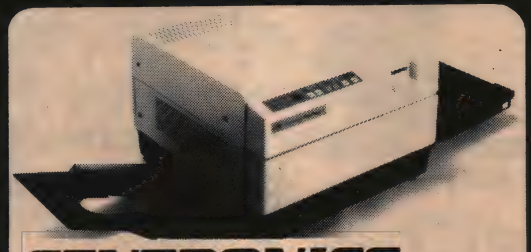

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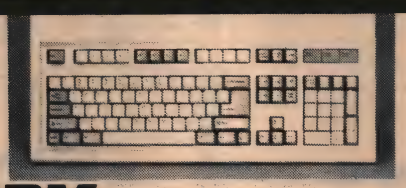

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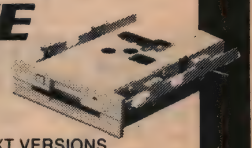

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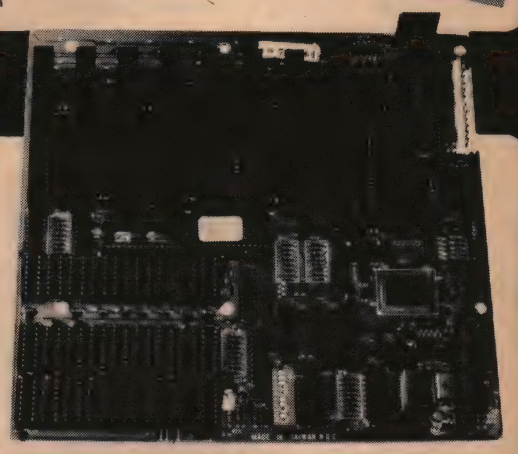

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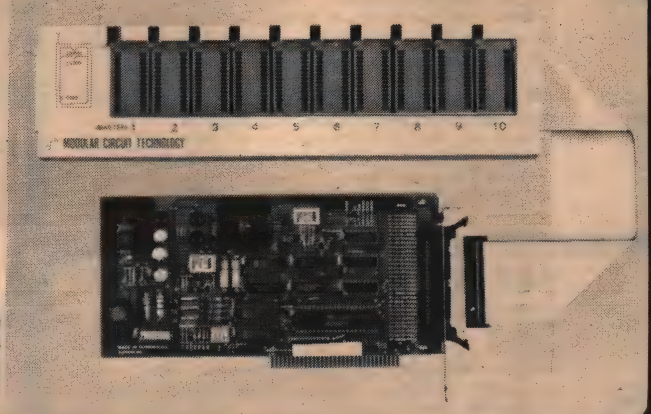

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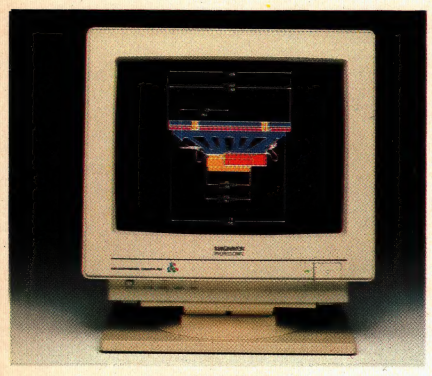

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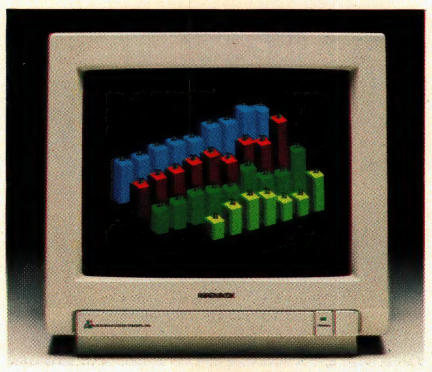

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- RGB & TTL separate inputs
- Mode 1: 16 color/640 x 200
  Mode 2: 64 color/640 x 350

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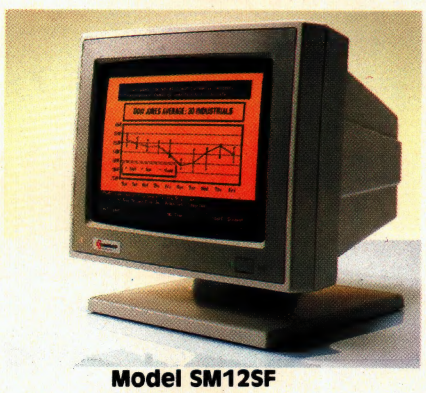

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- High resolution

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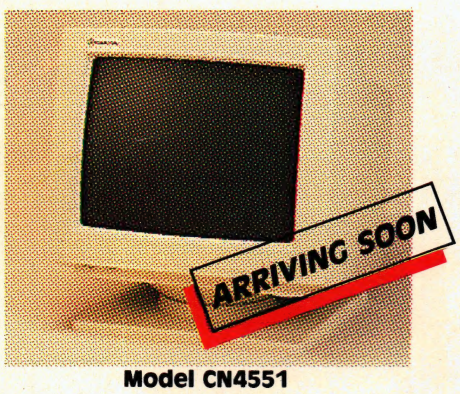

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- .31 dot pitch
- 720 x 480 resolution
- Tilt 'n swivel base
- IBM CGA, EGA & PGA compatible

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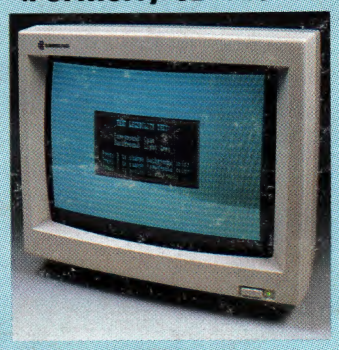

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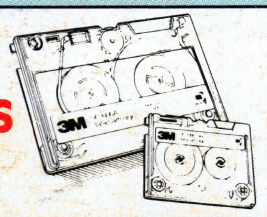

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